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THE FAR EASTERN REVIEW

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Engineering

Finance ❋ Commerce

Vol. IX., No. 1. ❋ SHANGHAI—MANILA ❋ June, 1912.

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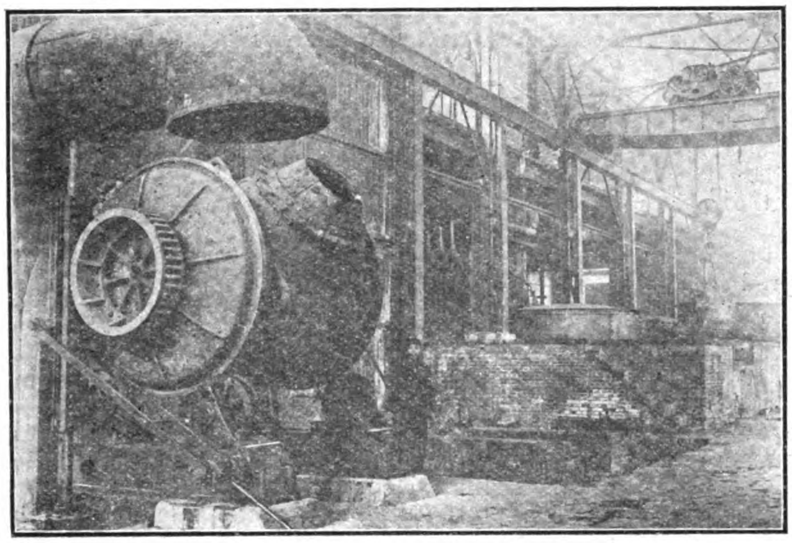
VOL. IX. SHANGHAI AND MANILA, JUNE, 1912 No. 1.

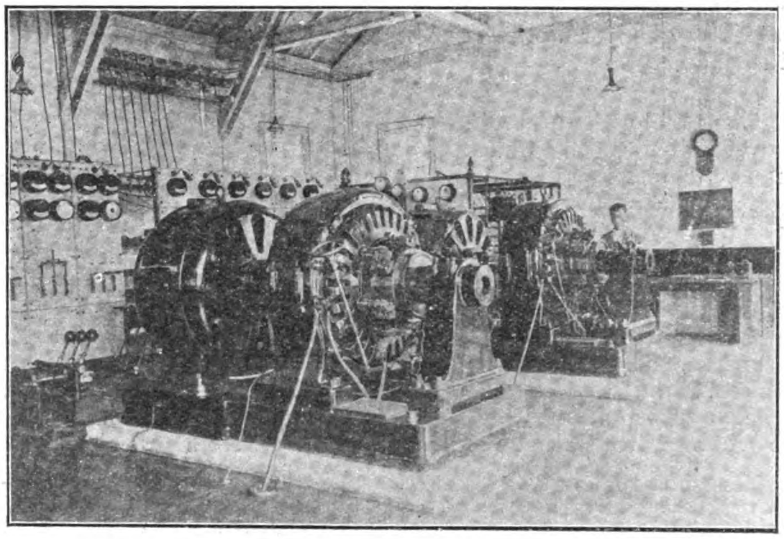
THE MINES OF THE ORIENT

*THE FURUKAWA MINING COMPANY

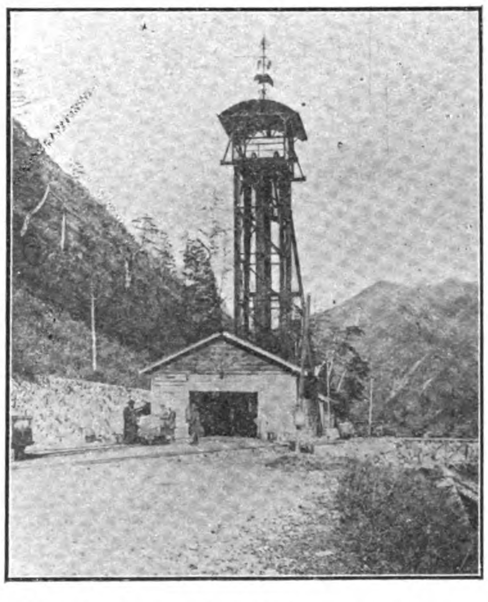
The present Furukawa Kogyo Kaisha (Furukawa Mining Co.) was formerly known by the name of Furukawa Kogyo Jimusho (Furukawa Mining Office) having been founded by the late Mr. Ichibei Furukawa, who first engaged in the mining business by purchasing the Kusakura Copper Mine, Niigata Prefecture, in 1875. The business conditions having proved very favourable, Mr. Furukawa was enabled to invest the profits gained from the mine in purchasing two other mines, the Yabusa Copper Mine, in Fukushima Prefecture, and the Kujurobata Silver Mine, in Niigata Prefecture, and opened the way for future development. The business of the firm was greatly expanded afterward by the incorporation of several other mines such as the Copper mine of Ashio, Tochigi Prefecture, in 1877, the Innai Silver mine, Akita Prefecture in 1884, and the Ani Mine, Akita Prefecture in 1885. Mr. Ichibei Furukawa became a millionaire by his successful mining enterprises, and was known as the mining king of Japan. He died in 1905 leaving his vast property to his son and heir Mr. Junkichi Furukawa. The latter succeeded to the business of his father, consisting of sixty-nine mining concessions with an area of over 20,000 acres of mines of various description such as copper, silver, and coal. In order to extend the sphere of business as well as to place the foundation of the concern on a firmer basis, the organization was converted in 1905, into a judicial person under its present name. Mr. Junkichi Furukawa himself became president of the Company and appointed Mr. Kei Hara to superintend the whole management. Afterward when Mr. Hara accepted the post of Cabinet Minister and retired from business, Mr. Chohichi Kimura, a member of the firm was appointed to succeed him. When Mr. Junkichi Furukawa died some years after, his younger brother and heir Mr. Toranosuke Furukawa succeeded him as president of the Company.



COPPER CONVERTOR, ASHIO



MOTOR GENERATORS IN MUKUMATO SUB-STATION



HEAD GEAR, SHINNASHI SHAFT, ASHIO

The capital of the Company is Yen 5,000,000 wholly paid-up and the principal business of the company is mining, with the electrical metallurgy of copper and the manufacture of coke as subsidiary business. We shall give below the summarized account of both respectively.

The mines owned by the company are distributed all over the country,

* From Official Reports.

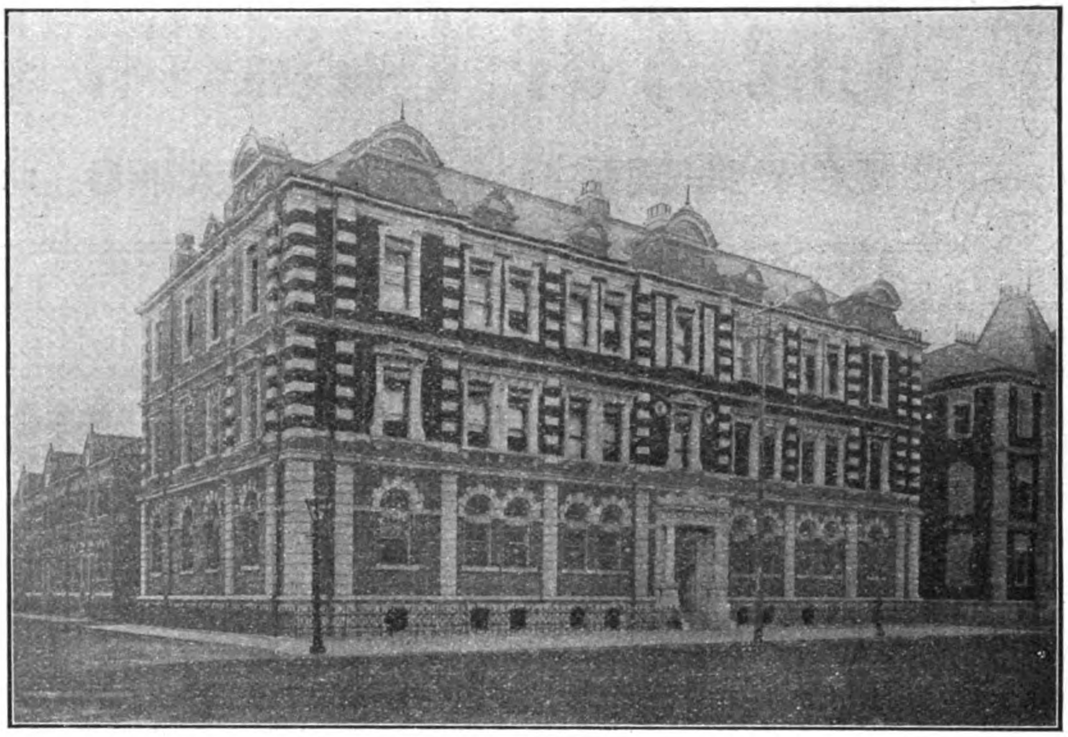
259636

numbering over ten with a total superficial area of 26,000 acres. The total output in 1907 was Yen 6,600,000 for mineral products and Yen 1,998,000 for coal. The following table gives the latest amount of production for the different mines.

Ashio Mine	Copper.	12,000,000	lbs.
Innai Mine	Silver.	106,666	oz.
Ani Mine	Copper.	2,200,000	lbs.
Kusakura Mine	,,	510,000	,,
Nagamatsu Mine	,,	460 090	,,
Otori Mine	,,	220,000	,,
Furokura Mine	,,	1,000,000	,,
Midzusawa Mine	,,	450,000	,,
Kune Mine	Mineral ore.	44,444	,,

Western Mining Department.

Shiogami, Menoo	Coal.	380,000	tons.
Shinoyamada	Coal.	110,000	,,



HEAD OFFICE OF THE FURUKAWA MINING CO., TOKYO

ASHIO COPPER MINES

(Annual production 7,000 tons of copper)

Location

The Ashio Copper Mines are in the town of Ashio in Tochigiken, about 18 miles from Nikkō.

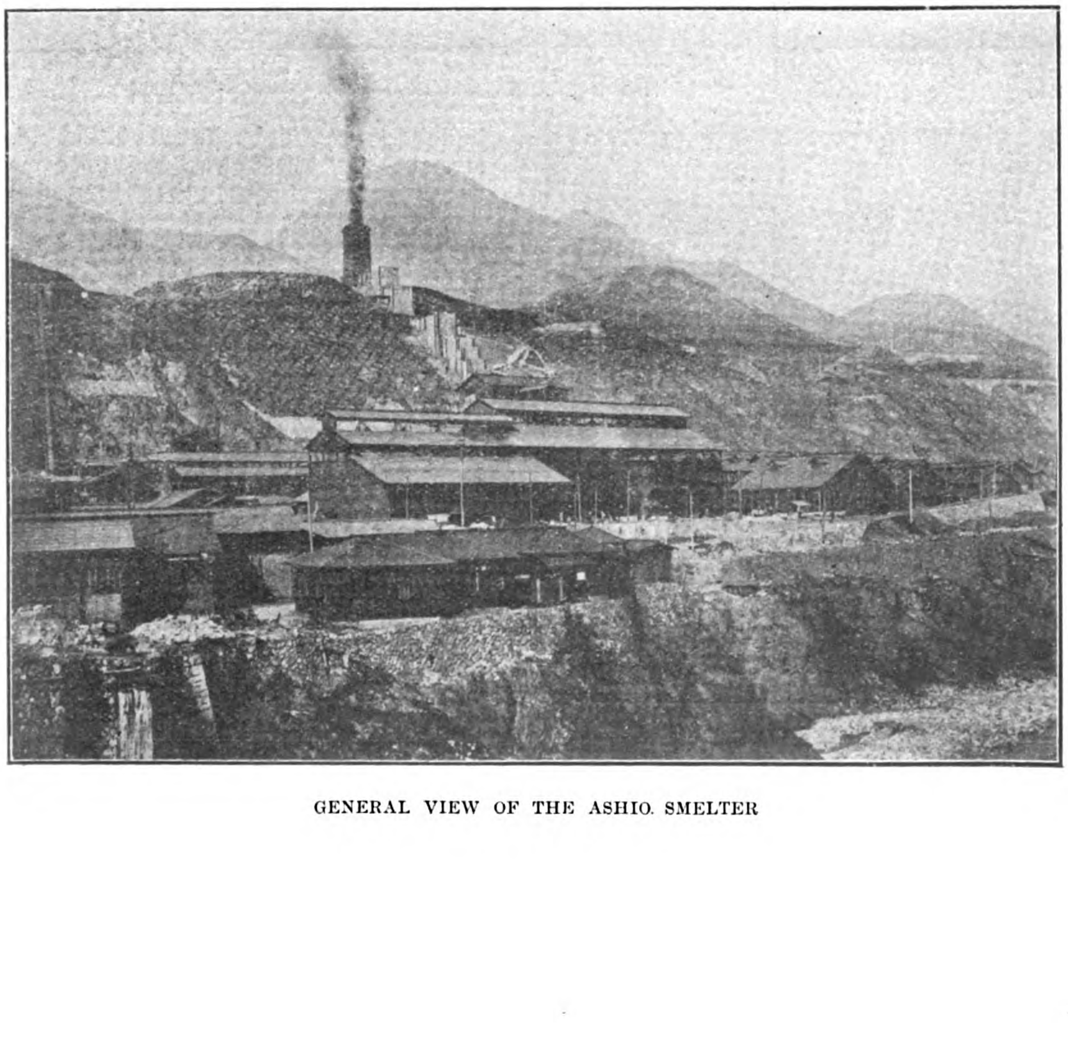
The area of the concession is 1,500 acres. The mines are divided into three, viz. Honzan, Kotaki, and Tsūdō, which are distant three miles from each other. Each has its own dressing plant, and the reduction works are at Honzan while the copper works are established in Nikkō.

History

The Ashio Copper Mines were discovered in 1609 and were a producer in 1611. Under the administration of our government, they were developed to reach a productive capacity of about 150 tons of copper yearly in the latter half or seventeenth century, but unfortunately in the nineteenth century it was decreased again. In 1871, they were transferred to private hands, and in 1877, the property at last came into the possession of the late Ichibei Furukawa, the father of the president, in such poor condition that the yield was only 52 tons of the copper a year.

By the vigorous efforts and careful administration of the late I. Furukawa and his successors, the mines were brought up to the present state—the largest copper mines in the Empire,—reaching an annual productive capacity of 7,000 tons.

In 1905, the Nikkō Copper Works were founded with the object of refining the bessemer copper from Ashio Copper Mines as well as the blister coppers from other mines of our company. In 1908, they absorbed the Honjō Copper Works of our company, and now manufacture electrolytic copper, bars, wire, etc.



GENERAL VIEW OF THE ASHIO SMELTER

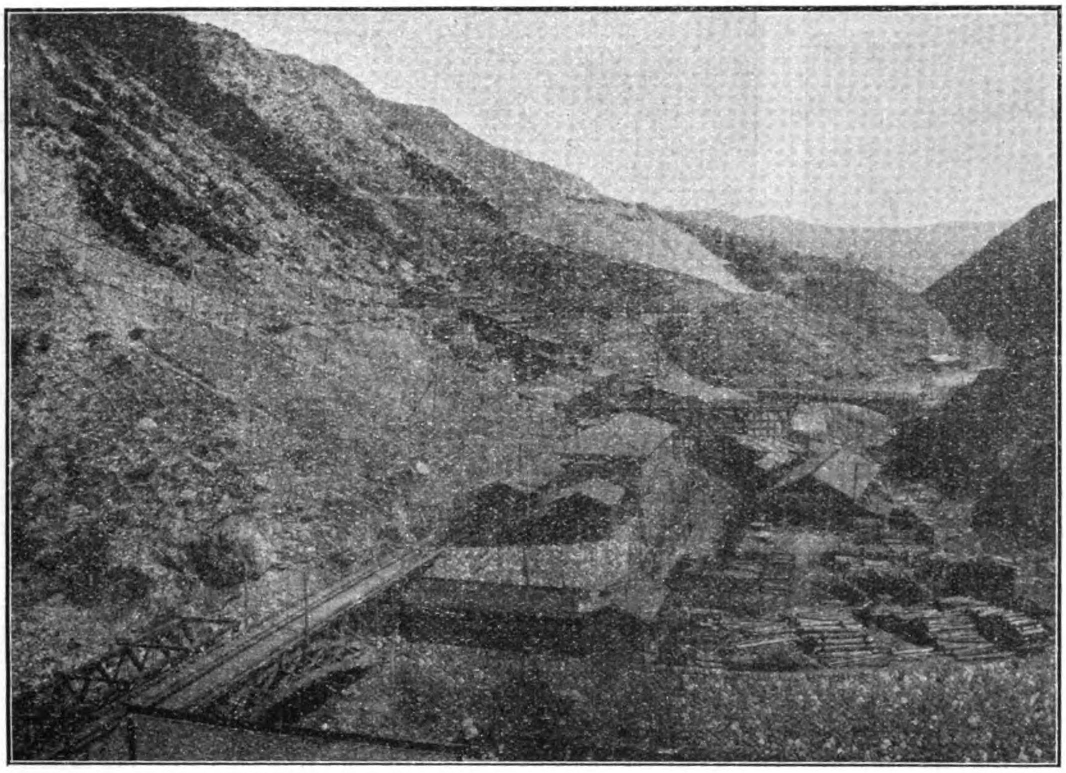
Geology and Ore Deposit

The district of Ashio consists of chiefly Paleozoics and liparite. The Paleozics are composed of slate, quartzite and limestone. The liparite is a volcanic neck erupted through the Paleozoics and is more than 2 miles in diameter.

The ore deposit of Ashio Mines is veins, most of which traverse the liparite, but the remainder run in the liparite as well as the Paleozoics, or in the Paleozoics only. The dip of the veins is mostly very steep, and the strike is classified into two, viz (I) N 50°-60° E and (II) N 80°-85° W. The veins on the first strike are called the sixty degree, or Yokomabu Series, and the others are the hundred degree or Shinsei Series.

The mines have more than 200 lodes, and among them 30 of the Yokomabu Series and 40 of the Shinsei Series are now being worked. The fissures of both series of veins are broken out simultaneously by the lateral pressure which folded the main mountain system of the north arc of Japan. They intersect with each other and form rhombic nets of veins. The lodes are generally 1-16 ft. thick and 400-6,000 ft. long.

The chief constituents of the veins are chalcopyrite and pyrite ; and quartz as a vein stuff. Besides, zincblende, arsenopyrite, galena, and pyrrhotite frequently occur. Bornite, chalcosite, cuprite, malachite, pisanite, sometimes azurite and native copper are all found in the oxidized zone. Besides quartz as a vein stuff, there are found calcite,



GENERAL VIEW OF KOTAKI, ASHIO COPPER MINES

and sometimes gypsum, which is the secondary mineral. Very rarely fluorite, crystallized vivianite, ludlamite, wolframite, and apatite are found.

Yokomabu is the champion lode, 6,000 ft. long, and the next is Kōsei, having 3,000 ft. in strike. The veins of Jimbō, Yasubeihi, and Deai are more than 2,000 ft. long. The Kōsei-machi, and Tengu, supposedly the same vein, have a total length is 4,500 ft. Eisei and Shinsei are more than 2,000 ft. long.

Mining

Main Levels and Shafts. The three mines of Honzan, Kotaki, and Tsūdō communicate with each other by levels and shafts, of which a few principal ones will be briefly described in the following lines:

Honzan Mine.

Ariki level:—The adit is situated at the north-eastern foot of Bizendate Peak. The level is driven mainly along the strike of Yokomabu-vein, and is 10 ft. high, 10 ft. wide and about 7,000 ft. long. It is the most important level for transportation and drainage in Honzan Mine.

Honkuchi level:—The level is older than Ariki, and is 300 ft. above Ariki level, being numbered to be the fourth level from the latter. It is also driven along the strike of Yokomabu vein, and is 7 ft. high, 8 ft, wide, and 6,000 ft. long. In the upper part of this level, there are more than 10 levels and many working places can be seen.

Honkuchi shaft:—The shaft (6 ft. × 9 ft.) is situated about 2,600 ft. from the mouth of the Honkuchi level, and reaches Ariki level.

1st and 2nd Yokomabu shafts:—1st Yokomabu shaft (6 ft. × 11 ft.) and 2nd Yokomabu shaft (6 ft. × 18 ft.) are situated on Yokomabu vein at a distance of 4,600 ft. and 2.500 ft. respectively from Ariki adit, whence at a depth of 457 ft. and 410 ft. they reach Tsūdō level. A winding apparatus is fitted up in each shaft. There are 7 levels and many working places which are now being operated prosperously.

3rd. Yokomabu shaft:—The shaft (5 ft. × 12 ft.) is 1,900 ft. from 1st Yokomabu shaft and passes through Tsūdō level at 466 ft. below Ariki level, and moreover further sinking is going on. Winding apparatus is provided in this shaft mouth for the working below Tsūdō level.

Kotaki Mine

Kotaki level:—The adit is situated at the south western foot of Bizendate Peak, and 45 ft. below the Ariki adit. It is driven chiefly along the strikes of Kōsei, and Tengu vein, and connected with Ariki level. It is the lowest and also the most important for transportation and drainage in Kotaki Mine. Both Kotaki and Ariki levels are used as a trunk line for the underground communication between Honzan and Kotaki Mines. There are 12 levels above this level and 6 levels below within the reach Tsūdō level.

Kotaki shaft:—The shaft (6 ft. × 14 ft.) is situated near Kōsei vein and at a distance of 2,100 ft. from Kotaki adit, and it reaches Tsūdō level at a depth of 405 ft.

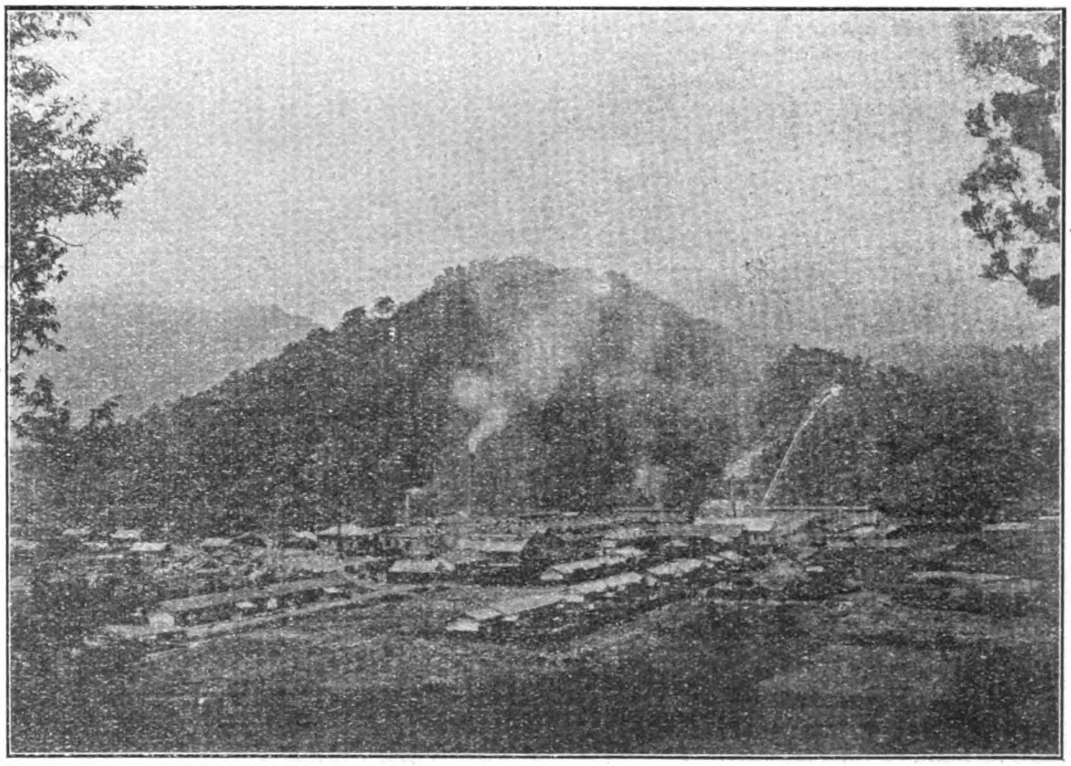
Tsudo Mine

Tsūdō main adit:—The adit is located on the bank of the River Watarase, and is 475 ft. lower than Ariki level. The driving of the level began in 1885 and the level reached Yokomabu vein in 1895, after having proceeded on about 10,000 ft. toward north. More than fifty veins were cut during the driving and most of them are working prosperously now.

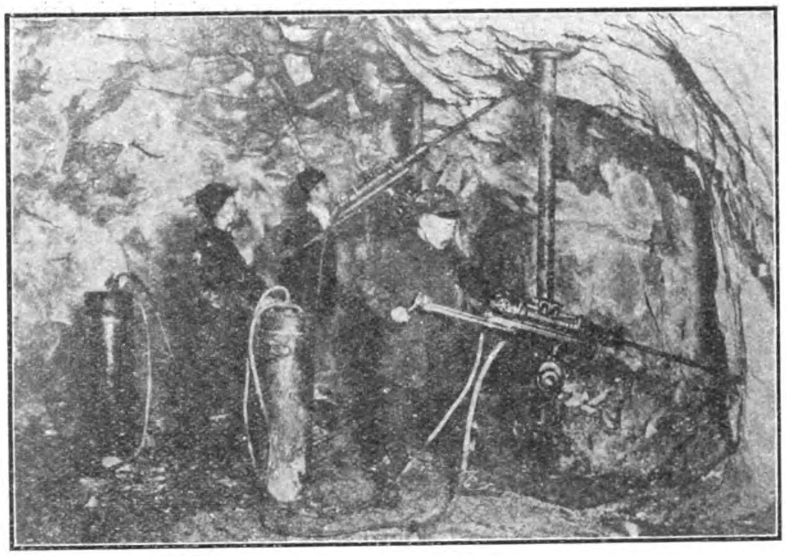
It is the main drainage and transportation level at present, being 11 ft. high and 13 ft. wide.

Honban level:—At a height of 620 ft. from Tsūdō adit, we can find this Honban level. There are 7 levels below it, and 2 levels above it.

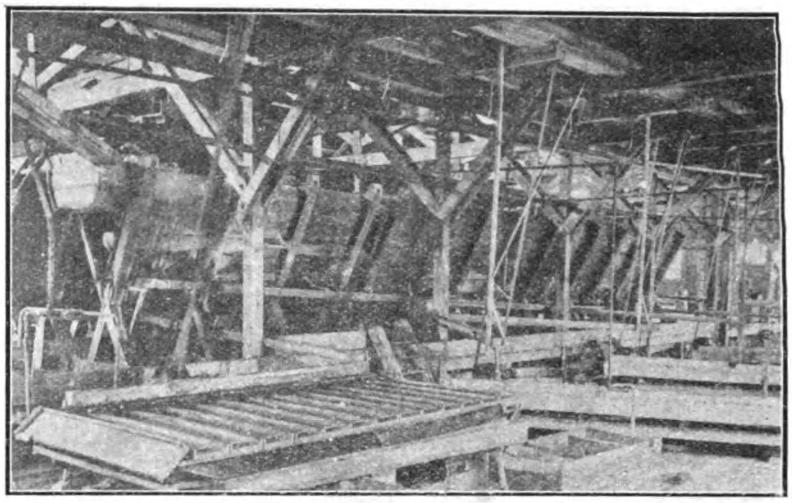
Shinnashi shaft:—The shaft (9 ft. × 12 ft.) opens near Tsūdō dressing plant,



GENERAL VIEW OF NIKKO COPPER WORKS



"LEYNER" ROCK DRILLS, ASHIO COPPER MINES



OVERSTROME CONCENTRATORS AND WILFLEY SLIME TABLES, TSUDO, ASHIO

being 107 ft. deep, and communicates with Tsūdō adit at a distance about 800 ft. from this adit mouth. The shaft is used for winding crude ores and rubbish.

1st. Kōsei shaft:—The shaft (6 ft. × 18 ft) is very near Kōsei vein, and is situated at a distance of 2,600 ft. along the No. 23 vein westward from the Tsūdō adit. The depth of this shaft is 843 ft. at present and further sinking is now in progress. There are 7 levels connecting with this shaft for the working of the veins Kōsei, Kōseimaehi, Tengu, Rensei, etc.

2nd. Kōsei shaft:—The shaft (6 ft. × 18 ft.) is located at a distance of 2,000 ft. westward from 1st Kōsei shaft along the vein Kōsei. It is 420 ft. deep. There are 4 levels connecting with the shaft for the working of eastern part of the vein.

Kōsei-maehi shaft:—The shaft (6 ft. × 23 ft.) is situated on the vein Kōsei-maehi; and the present depth is 352 ft. below the Tsūdō adit. Further sinking is now in progress.

The total length of levels in use is as follows:

Honzan Mine	270.000 ft.
Kotaki Mine	160,000 ft.
Tsūdō Mine	130,000 ft.
Total	560,000 ft.

The vertical extent of the veins—from the highest outcrop to the lowest level—being now excavated is as follows:

Outcrop on Bizendate Peak to Tsūdō adit	2,200 ft.
Below Tsūdō adit . . .	800 ft.
Total	3,000 ft.

Prospecting and Working methods. The prospecting is chiefly done by level driving with a size of 4 ft. × 7 ft. either along the vein, or crosscutting with an interval of 60 ft. in height. As to the lower part of the Tsūdō adit, the level driving is commenced in the same way from the shaft at a rate of 110 ft.

Overhand stoping is generally adopted here, and sometimes underhand stoping and *Nukibori* (special working for the richer part of vein) are used. Each stope is 6 ft. high and more than $2\frac{1}{2}$ ft. wide varying according to the thickness of the vein being worked.

The excavation is chiefly done by hand, but the rockdrill is used to some extent in driving, sinking, etc. There are several kinds of rockdrills in use, for instance, Water Leyner, Little Wonder and others.

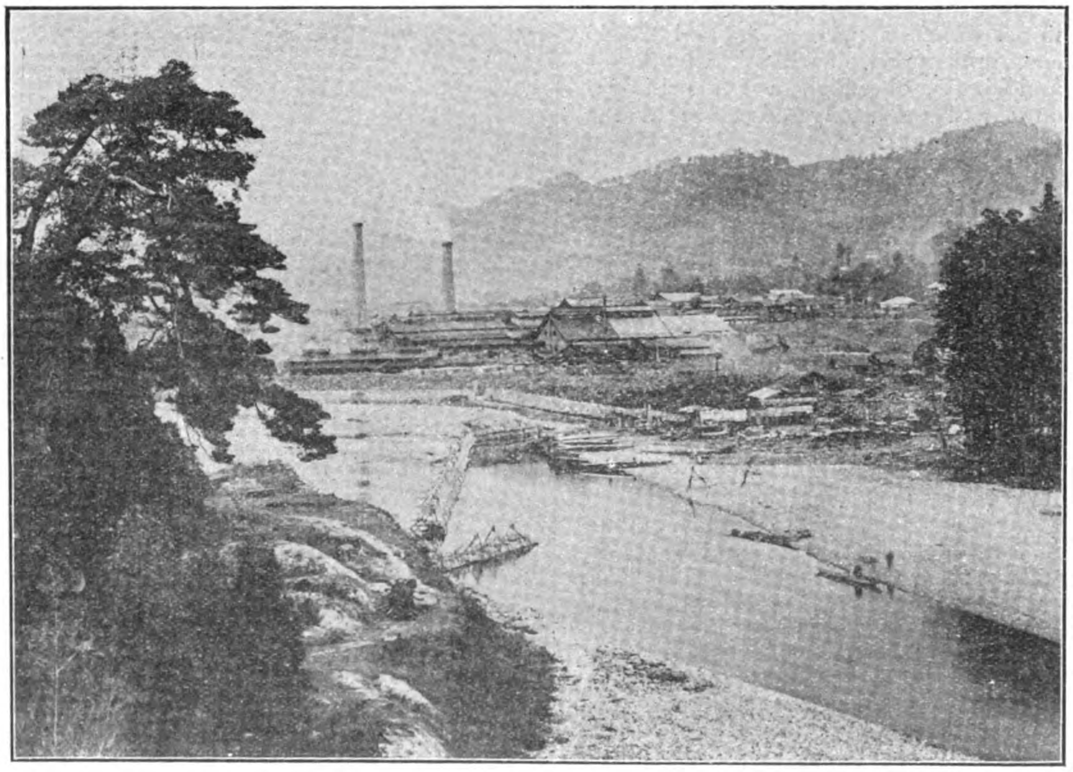
The present numbers of workings and miners are as follows:

Prospecting. .	450 places,	1,000 men.
Stoping . . .	1,000 „	1,600 „
Nukibori. . .	40 „	150 „
Total . . .	1,490 „	2,750 „

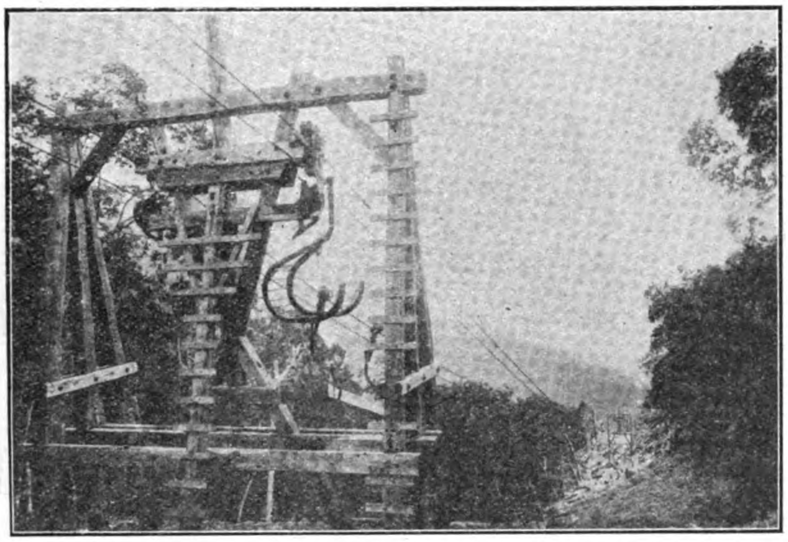
Timbering. As the materials of timbering, only rough round logs are used in the mines. There are several forms of timberings such as simple legs and cap, saddle back, and polygonal shape, each being used according to circumstances. It is quite interesting to write that large excavated spaces such as the winding and pumping rooms, about 40 ft. wide, about 25 ft. high, are well timbered with big logs.

Transportation underground. The ores, rubbish, and various supplies are transported by electric locomotives, electric windings, and other means according to circumstances.

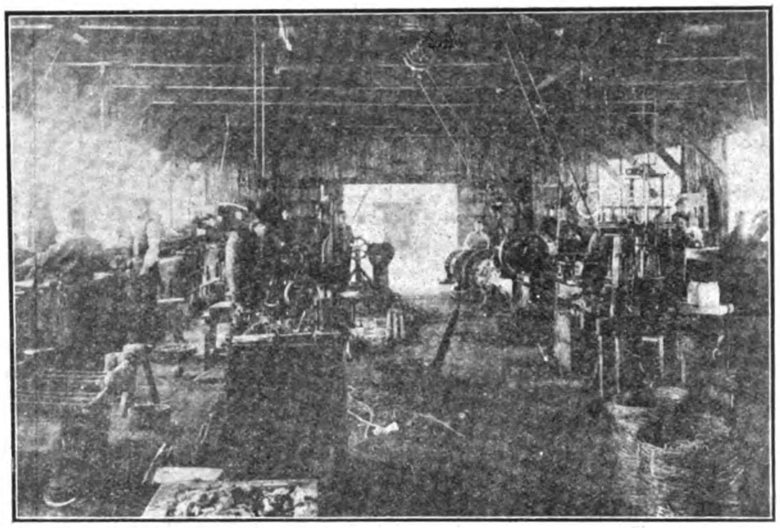
The electric locomotives are widely adopted in the three main levels of Ariki, Kotaki, and Tsūdō. The ores of the mines Kotaki and Honzan, directly, and those of Tsūdō after being wound up through Shinnashi shaft, are transported to their own dressing plants. The rubbish of Honzan and Tsūdō is transported directly to the dump, while that of Kotaki is brought to the rope-way terminal, whence it is sent to the dump.



GENERAL VIEW OF ANI COPPER MINES



DOUBLE ROPE TRAMWAY AT NERI, ASHIO



ELECTRICAL REPAIR SHOP, ASHIO

Winding machines are equipped in all the shafts in the mines, and the following is a brief description of them.

Name.		depth.	type.	H.P.
1st. Yokomabu shaft.		495 ft.	Electric double drum	40.
2nd. Yokomabu	,,	637 ft.	,,	50.
3rd. Yokomabu	,,	933 ft	,,	50.
Honkuchi	,,	295 ft.	Self act'ng drum	
Kotaki	,,	588 ft.	Electric double drum	50.
1st. Kōsei	,,	843 ft.	,,	100.
2nd. Kōsei	,,	420 ft.	,,	75.
Kosei-maehi	,,	352 ft.	,, (temporary.)	25.
Sunokobashi	,,	337 ft.	,	35.
Shinnashi	,,	107 ft.	,,	80.

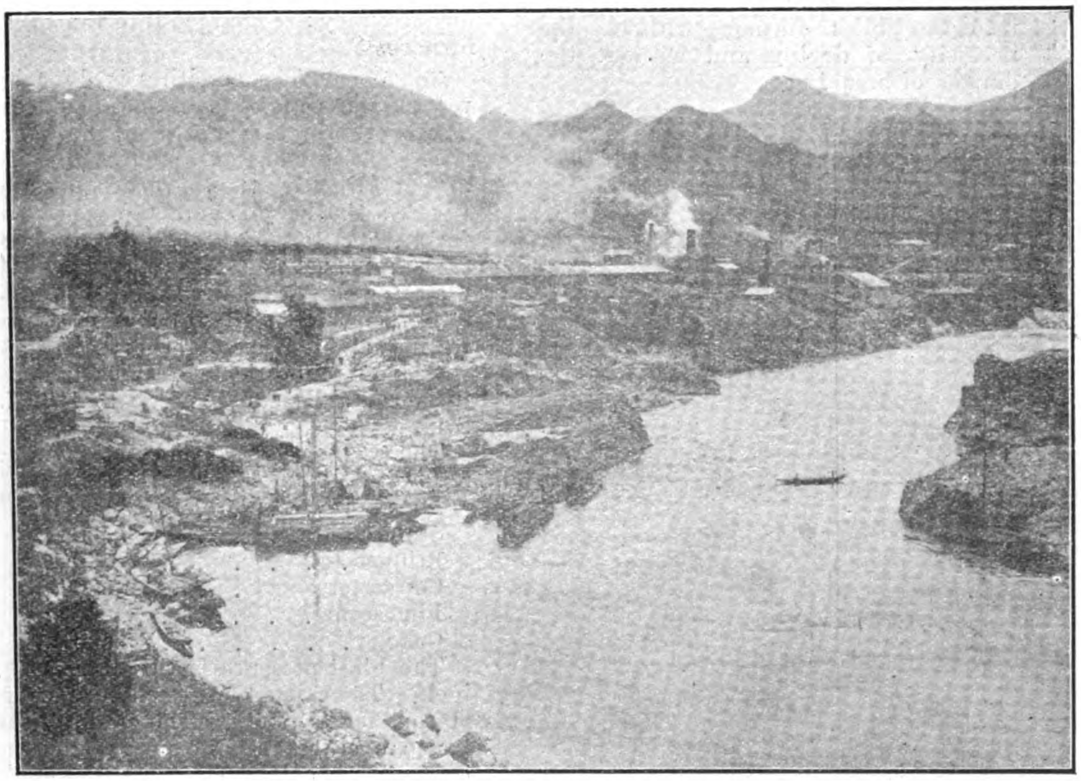
Pumping and Drainage. The Ariki and the Kotaki levels are used to drain out the mine water coming from the above but the rest of the water is drained out from the Tsūdō adit.

There are a great number of pumps of which the principal are as follows:

Site.	type.	No.	H.P.
1st. Kōsei shaft.	Sulzer two stage turbine pump.	3	50.
,,	Riedler single differential pump.	3	100.
,,	,, ,, ,,	1	75.
,,	Escher-Wyss turbine pump.	1	75.
,,	Knowles vertical pump.	2	25.
,,	Spec al rod pump.	2	30.
2nd. Kōsei shaft.	Blake pump.	1	50.
,,	Knowles pump,	2	15.
3rd. Yokomabu shaft.	Escher-wyss turbine pump.	3	75.
,,	Knowles vertical pump.	2	15.
2nd. Yokomabu shaft.	Tanaka's vertical pump.	2	15.
,,	Knowles vertical pump.	1	25.
,,	Knowles sinking pump.	1	5.
,,	Blake rod sinking pum .	2	50.

Ventilation. The ventilation is secured by the natural draught but sometimes the circulation is helped by the means of regulating doors, wind boxes, etc. The wider the extension below the Tsūdō adit become, the more the difficulties of the ventilation increase, and centrifugal fans are used for blowing in the fresh air.

Lighting. The main levels, the pumping and winding stations and the watch houses are illuminated by electric light. Each miner carries a small seed-oil lamp with a naked light.



GENERAL VIEW OF KUSAKURA SMELTER

Transmission of Electricity in the mine. All the machinery in the mines is driven by electricity. 11,000 volt alternating current from Hosoo hydro-electric power plant is transmitted into three substations—Matō, Kotaki and Sunokobashi—where it is transformed down to 2,200 volts. In the Matō the 2,200 volt alternating current is partly converted to direct current of 450 volts, which is used for the driving of tramway locomotives and the winding machines in Honzan Mine. The 2,200 volt alternating current from Sunokobashi substation is transformed dcwn again to 500 volts near the 2nd Kōsei shaft, whence it is transmitted to several machines thereabouts. The alternating current from Kotaki substation is also stepped down to 500 volt near 1st: Kōsei shaft for the driving of several machines in Tsūdō Mine. The power for Kotaki Mine is supplied from Kotaki substation. The mine locomotives in Tsūdō Mine are driven by direct current of 450 volts from the Tsūdō power plant.

For the transmission of 500 and 2,200 volt alternating current, steel armoured paper cables and lead covered paper cables are used. The length of the cables for 2,200 volt alternating current is 32,000 ft., and that for 500 volt is 11,000 ft.

Dressing

Crude ores here in the mines are classified into two kinds; 1st grade and 2nd grade. The former is rich ore sorted underground and carries 12% copper on the average. The latter averages 1% copper more or less.

The daily output of crude ores from the three mines is as follows:

	quantity	percent of copper	copper content
1st. grade.	145 tons.	12.4	17.4 tons.
2nd ,,	610 ,,	1.0	6.1 ,,

Three mines have their own dressing plants, and the dry and wet processes are adopted in these plants. The operatian is described in the accompanying schemes.

The driving of the machinery of the dressing plants is chiefly done by electricity.

The concentrates from these plants are 170 tons daily on 12% copper.

Cement Copper

There are two sources for the winning of cement copper. (1) old workings, abandoned levels, and gob or stope fillings having been exposed for a long time to the oxidizing influence, are the producers of the high grade cupriferous water. (2) the other is the weathered rubbish which has been neglected for years in the dumps. From the waters which reached through them, the copper is precipitated by means of scap iron.

The production is 1.2 ton of 58% copper a day, which is sent directly to the reduction works.

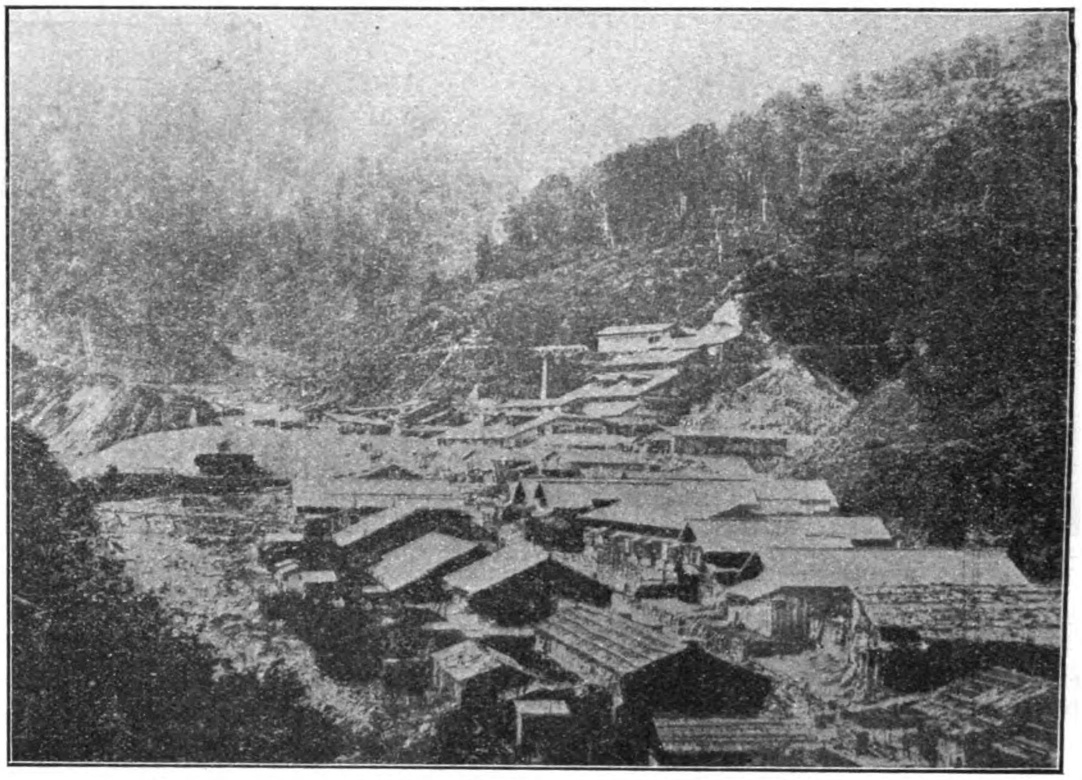
Reduction

Ores: The ores consist chiefly of chalcopyrite, pyrite, quartz and a little zincblende and galena. The receiving ores are classified into five: viz. lumps, grains, sands, slimes and cement copper. 60,000 tons of ores on 12% copper are being treated annually, which indicates the production of about 7,000 tons of copper.

Smelting process: The lumps are charged to the blast furnace in a raw state, and the fines in a sintered or a bricked state. The matte thus obtained is subjected to the Bessemer process.

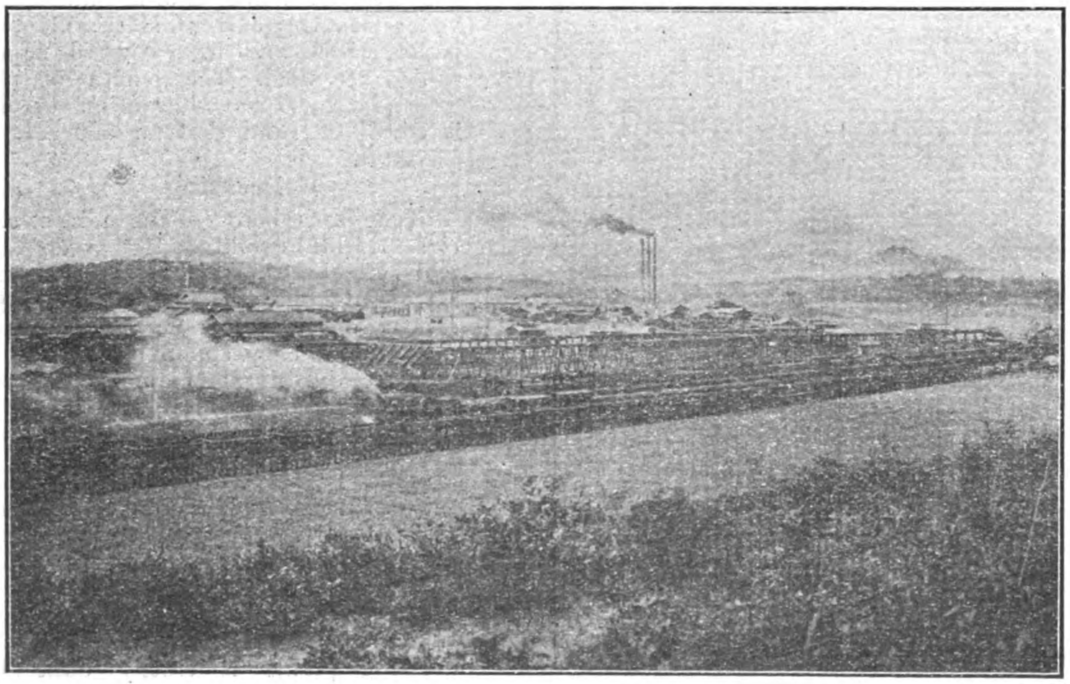
Pot-roasting. Most fines are roasted in pots until they become spongy. The pot used here—of a conical shape—is made of iron plate and has a false bottom which is worth notice, from which the blast is forced in. One charge is about 7 tons of ore. After the sintered mass is cooled thoroughly, it is crushed into suitable size for charging to the blast furnaces. There are twelve pots in two rows, which are used alternately.

Briquetting (patent processes.) There are two processes of briquetting of fine ore for which we hold the patents in America and Japan.



GENERAL VIEW OF FUROKURA COPPER MINES

The first:—The ore is first moistened with water and then compressed into a ball of the desired size by machinery. Such a ball is placed within the metal mold and the molten matte is then permitted to fill the space within the mold around the ball, and allowed to congeal. A series of the molds are mounted upon an endless carrier which is driven by an electric motor. It is quite interesting to charge the briquets into the blast furnace without the necessity of drying and without the danger of breaking.



SHIOGASHIRA COLLIERIES

The second:—The dried fines and molten matte are allowed to run into the pot, stirring them so that they may be thoroughly mixed together therein. When the mixed mass is chilled sufficiently, it is dumped out of the pot and crushed into suitable size for charging the furnace.

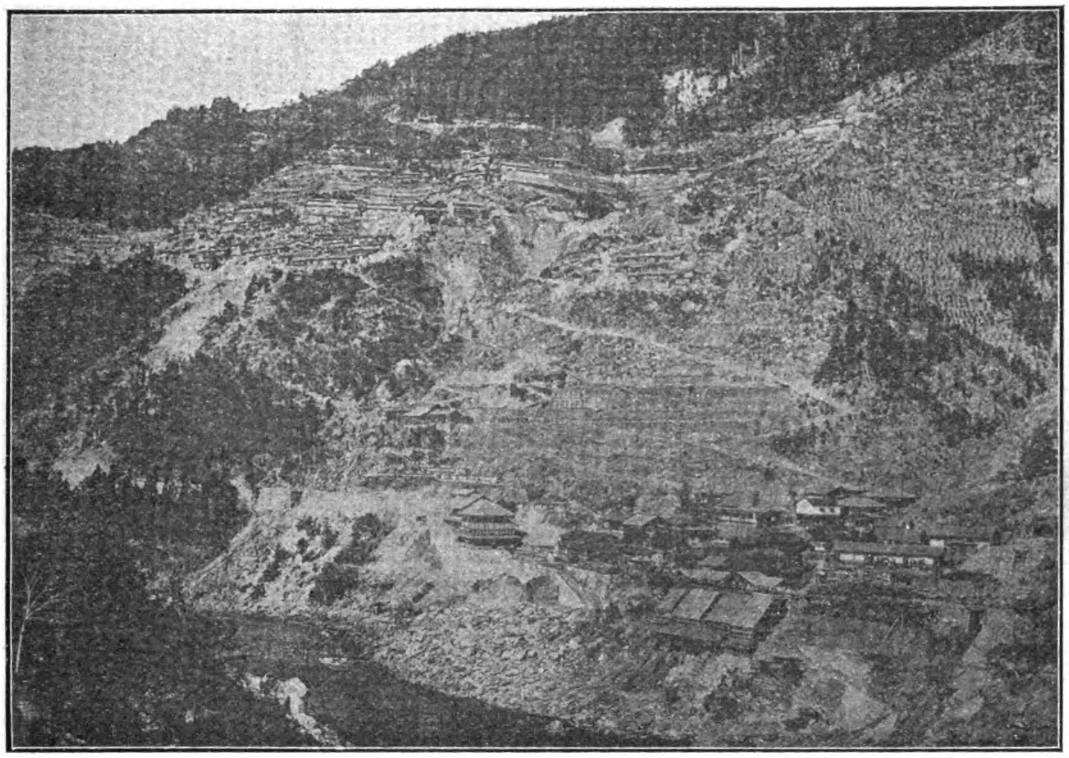
Briquetting (common process). The fines are mixed with slime water, and filled up into the mold, and then stamped into briquets. When they are sufficiently dried up in the drying furnace, they are charged into the blast furnace.

Smelting. The smelting is done by rectangular water jacket blast furnaces. There are three furnaces of the same size. The dimensions of the furnace are 160 inches × 42 inches at the tuyere; the height from the center of the tuyeres to feed floor, 8 ft. 6 inches; each furnace has 24 tuyeres whose diameter is 4½ inches, and has one forehearth, 12 ft. in inner diameter, 4 ft. in height. The forehearth is lined with magnesite bricks. For each blast furnace, a Roots blower No. 8 is equipped.

The normal charge composition is as follows:

Lump ore	3,600 lbs.
Sintered ore	3,500 ,,
Briquet	1,100 ,,
Converter slag . . .	1,600 ,,
Limestone	2,200 ,,
Coke.	650 ,,

The blast pressure is 1⅜ lbs. per sq. inch. The capacity of each furnace is 90 tons for 24 hours. The grade of the matte averages 40% copper; and the composition of the slag is sillica 40%, ferrous oxide 30%, lime 20%, alumina 9% and copper 0.2%.



GENERAL VIEW OF KUNE COPPER MINES

Converting. Keeping the matte out of the furnace in the forehearth, it is tapped out into a ladle in case of necessity and charge into converter by means of an electric travelling crane, and then the blast is started on. There are six converters, and two stands with hydraulic tilting gears, actuated by a high pressure, self-regulating pump, an accumulator, etc. The converter is of the barrel type, 72 inches in diameter, 100 inches in length, with 11 tuyeres, whose diameter is 1¼ inches. The tuyeres have Dyblie ball valves.

The blast is delivered by two horizantal blowing engines driven by electricity, capable of supplying 4,200 cub. ft. and 3,000 cub. ft. of free air per minute, and also a vertical one driven by water power, capacity 3,000 cub. ft. per minute. The pressure at the converters is 10 lbs. per sq. inch.

For the purpose of lining, a decomposed liparite is used.

The converters produce 45,000 lbs. of blister copper a day. The blister copper is poured out into molds by casting machines. Each ingot weighes 70 lbs.

Analysis of the blister copper.

Cu	99.125
Au	0.00016
Ag	0.10662
As.	0.029
Bi.	0.006
Fe.	0.05[illegible]
S	0.028
Se & Te	0.038

Waste Water and Smoke Problem.

The smoke from all the furnaces is forced in to the special dust chamber for condensation. Having precipitated nearly all of the suspended dust in the chamber, the fumes enter the common flue and again proceed to the bottom of the desulphurizing tower, wherein the sulphurous acid gas is absorbed by a shower of lime water, and the purified gas escapes through the chimney. The waste water is sent to the precipitating and filtering ponds.

The tail water from the precipitation of cement copper, the slimy water from the dressing plant and the waste water from desulphurizing tower are agitated after being with milk of lime, and are sent to the precipitating and filtering ponds. They are then discharged into the river in the clean and non-acid states.

Power.

The power is chiefly supplied from the Hosoo hyro-electric power plant laid down in 1905, (12 miles from Ashio) developing 2,500 H.P. The power plant is being extended to 7,500 H.P. Besides, we have other small power plants.

The plants are as follows :

Site.	H.P. of Water Wheel.	Generator.	Kw.
Hosoo.	2,500	11,000 volt three phase alternating current.	2,000
,,	125	Direct current.	80
Betsukura.	900	11,000 volt three phase alternating current.	700
Watarase.	250	2,000 volt three phase alternating current.	220
Tsūdō.	400	2,000 volt three phase alternating current.	270
Kotaki	300	450 volt direct current.	120
,,	100	450 volt direct current.	50

Also there are seven small water power plants which total 500 H.P.

Transportation.

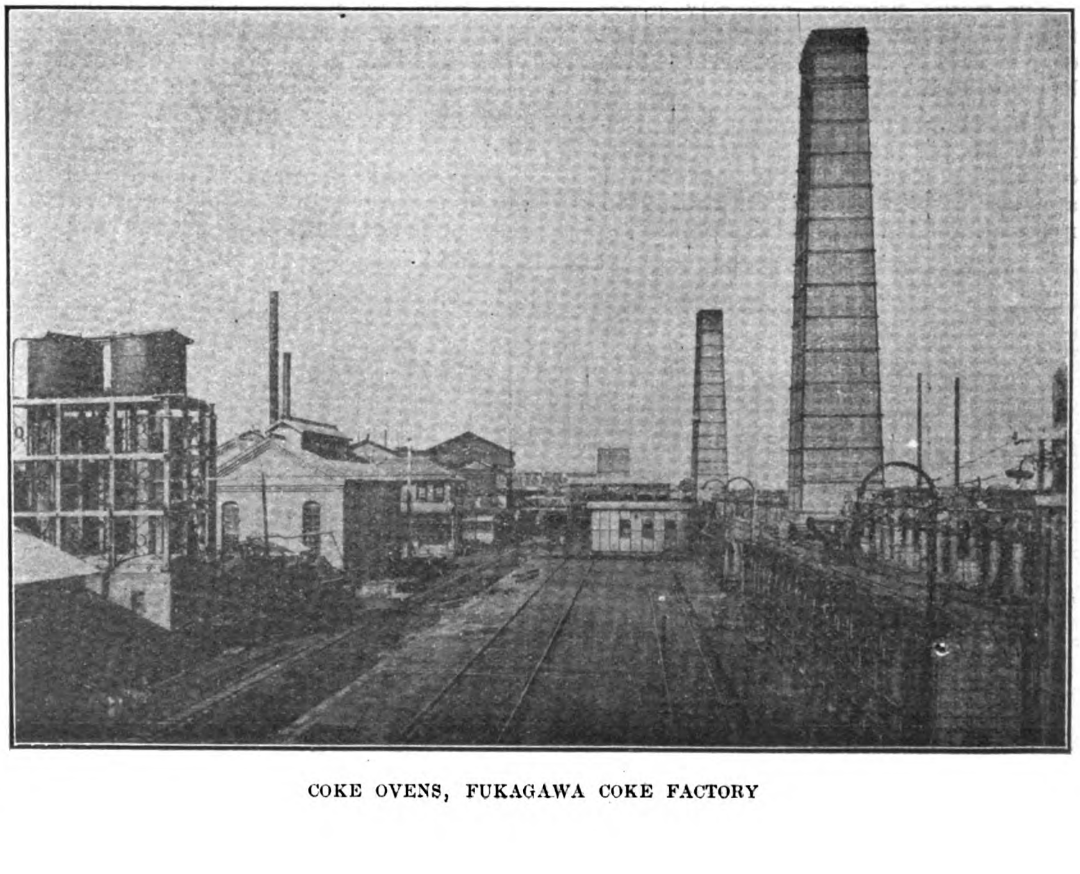
There are two principal transportation lines leading to the mines, viz. the Nikkō line and Ōmama line.

For the Nikkō line, tramways and aerial ropeways are provided now, and the capacity is about 1,300,000 ton-miles a year, this line being mainly used at present. For the principal part of the line, an electric railway has been just completed.

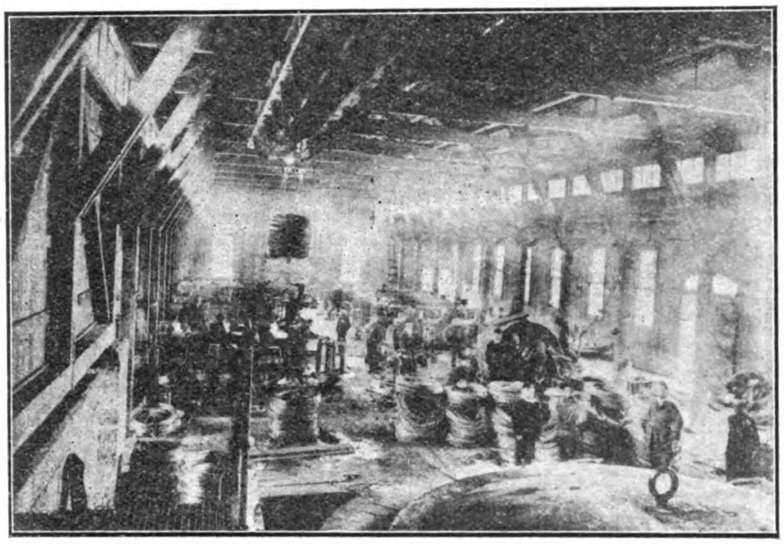
For the Omama line, wagons and tramways are used, but they are about to be superseded totally by a railway which is to be built by the Ashio Railway Co. connecting the mines and Kiryu station of the Imperial Government Railway. After the completion, this railway will be the main line of transportation.

Between each mine and reduction works, tramways are used.

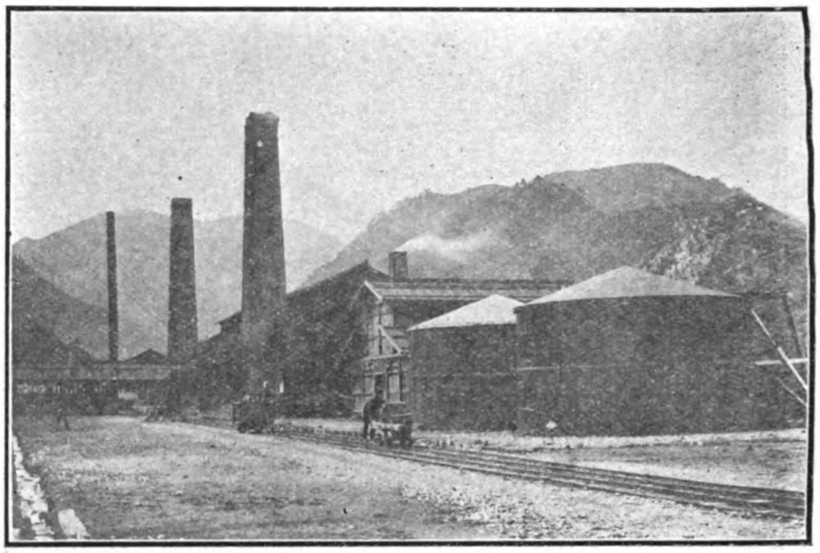
For the local transportation of timber, charcoal, linestone, etc., Bleihert double ropeway, Tamamura ropeway and Halidie ropeway are used.



COKE OVENS, FUKAGAWA COKE FACTORY



WIRE DRAWING SHOP, NIKKO COPPER WORKS



"MABUKI" HEARTH USING HEAVY OIL, KUSAKURA

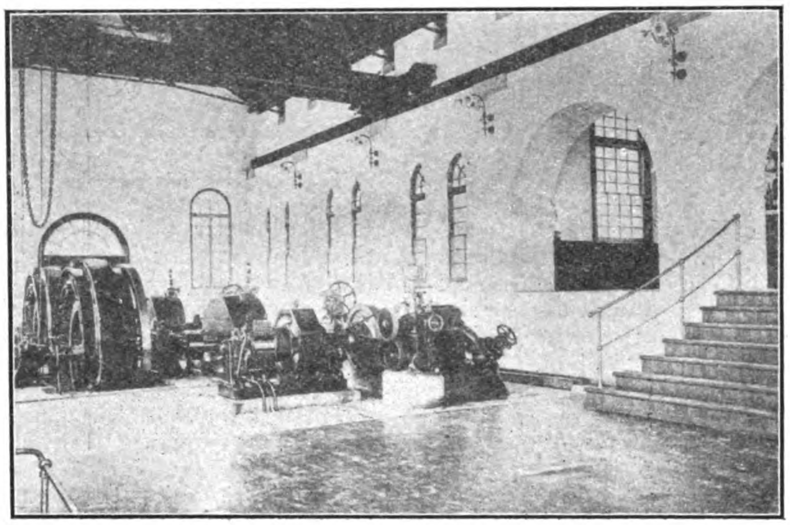
NIKKO COPPER WORKS.

The vicinity of Nikkō and Ashio are on the fringe of the median mountain range of Northern Japan. It is very near the Kwantō Plain, and water power can be secured in abundance. Under such conditions, the Nikkō Copper Works were established in 1905 just on the way from the Ashio Copper Mines, so as to afford facilities not only for the taking of the bessemer copper from Ashio, but the transportation of the materials for the works.

The bessemer copper from Ashio and the blister copper from the other mines of the Furukawa Mining Company containing silver and gold, are refined by electrolytic process, and the noble metals separated. The blister copper which does not contain silver and gold is refined in a reverberatory furnace.

The works produce annually 5,000 tons of copper wire, 2,000 tons of copper ingots, 500,000 ozs. of noble bullions, etc.

Reverberatory Refining. The bessemer copper and the blister copper, containing silver and gold, are refined and are cast into cakes for rolling to make an anode for the series process.



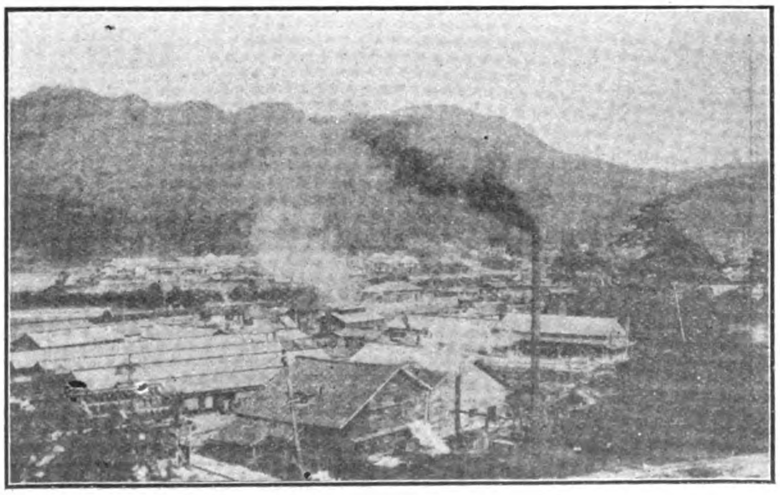
INTERIOR OF HOSOO POWER HOUSE, NIKKO

The blister copper without silver and gold, is refined and cast into ingots which average 99,7% copper. There are four furnaces, two of which have casting machines, and the capacity of each furnace is from 40,000 to 55,000 lbs.

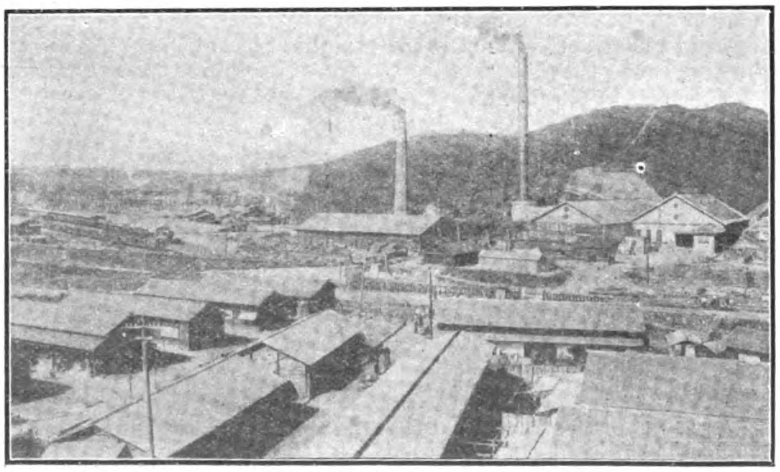
Electrolytic Refining. Here in this works, the series process of electrolytic refining is adopted. The copper cakes are rolled to $\frac{1}{4}$ inch and 12 inches wide. The plates are cut off into pieces of 24 inches long, and are sent to the electrolytic tanks (234 in number).

The anode slimes, collected in the tanks, are treated with sulphuric acid, and washed with water, and dried. The dried slimes are refined by English cupellation and cast into noble bullions.

(*To be continued*)



SHIMOYAMADA COLLIERIES



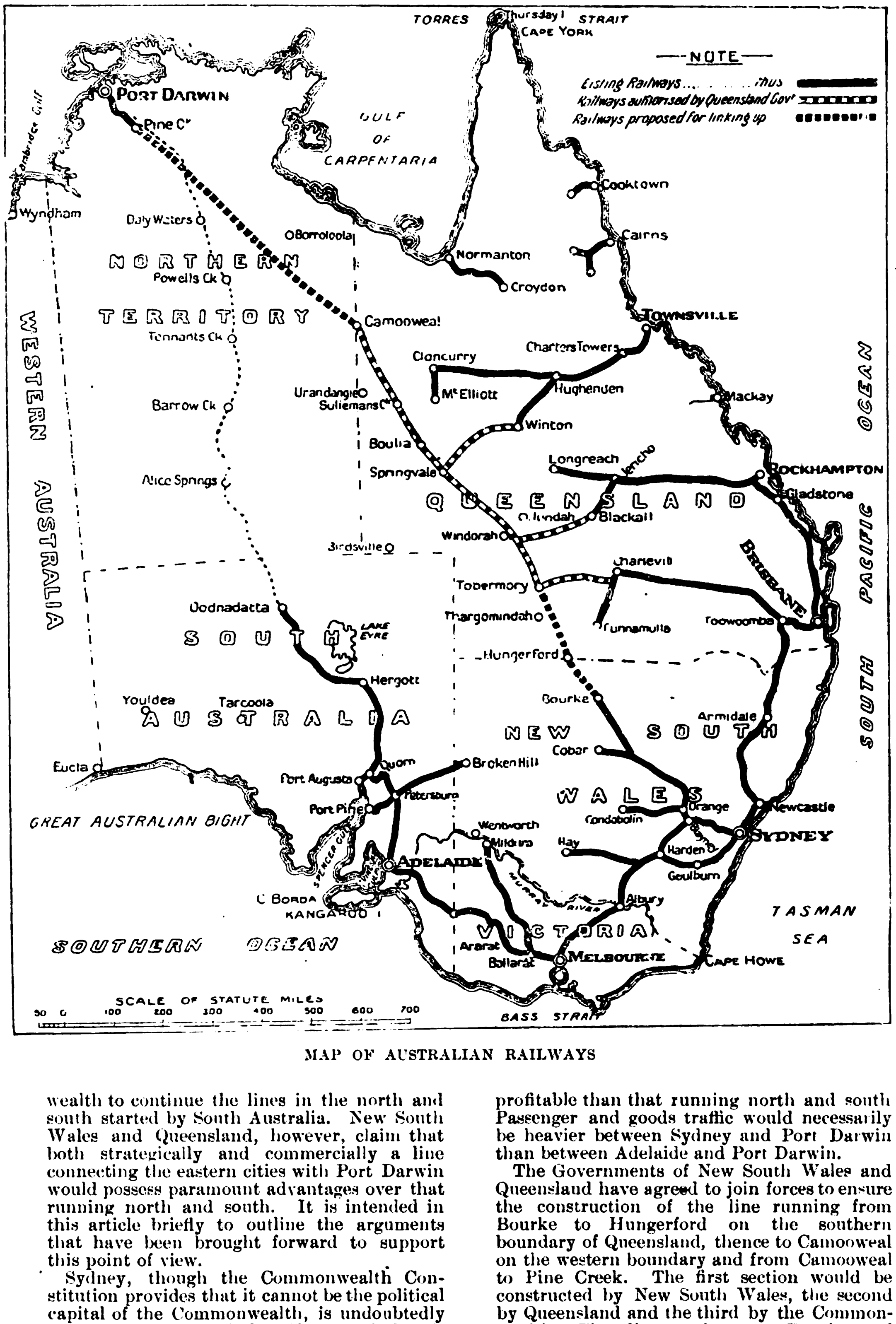
SHAKANOO COLLIERIES

RAILWAY NEWS

The Trans-Australia Railway.—The absence of any great water-ways in Australia renders the people of the Commonwealth practically dependent upon the railroad for internal communication. Unfortunately, in the early days of railway construction in Australia each colony followed it its own devices in regard to gauge and locomotive and rolling stock types, and there was no co-operation in the choice of route with the object of securing the best intercolonial service. These conditions prevail to this day and, as there seems little likelihood that the Commonwealth will be able to take over the railways, it is to be feared that they will endure for a long time to come. A glance at the map reproduced elsewhere will suggest even to the layman that the New South Wales lines were built on a perfectly haphazard system, the one definitive object being to bring all the traffic to Sydney. Queensland, on the other hand, has proceeded on a predetermined plan of pushing her lines inward from the coastal ports, and when the new construction that was authorized last year, and is to cost £6,000,000, is completed, the northern state will have the most effective system of railways in the Commonwealth.

The inauguration of the Commonwealth developed in Australia a national spirit, one of whose manifestations is the interest that is taken in works of national magnitude. In the old days, when the States were Colonies, the outlook both of the politician and the man in the street was restricted by the intercolonial boundaries. Parochialism is dying hard, but the Australian is learning to look at things from a national viewpoint. Since the Russo-Japanese War he has thoroughly awakened to the fact that Australia has concentrated her population in the corner of the continent most remote from danger and has left the north coast practically unsettled and undefended. It is from the north that the Australian has convinced himself that attack will eventually come, and he has taken steps to meet the danger, first by instituting a system of compulsory military training and secondly by deciding upon the construction of a railway to connect Port Darwin with the cities of the east and south. Inevitably, however, conflicting State interests rendered the selection of a route a matter of considerable difficulty, and to this is due the fact that up to the present the line has remained a pious aspiration. There are not wanting signs that the period of inaction is nearly at an end. The Press of Australia is giving constant attention to the question; the Sydney "Bulletin" deserves special recognition in this connection as it has for years past been doing its utmost, in season and out, to get the work taken in hand.

The map we publish elsewhere shows the two routes that have been suggested. When the Northern Territory was administered by South Australia the trans-continental line was always kept in view and the section from Adelaide to Port Augusta was pushed up to Codnadatta. In the north also a beginning was made and the track was laid from Port Darwin to Pine Creek. The finances of South Australia, however, could not stand the strain that would be involved by constructing considerably over 1,000 miles of railway through country for the greater part barren and waterless, except by having recourse to the land grant system. There is in Australia a profound distrust of this system and although suggestion in regard to its adoption were tentatively made, the proposals never came fairly within the sphere of practical politics. After federation South Australia recognised that there was an excellent opportunity of getting rid of the Territory, which was to her merely a financial incubus, and she therefore offered to transfer it to the Commonwealth. This offer, after some delay, was accepted and the Territory is now administered by the Australian Government. Opinion in South Australia holds that there is a moral obligation upon the Commonwealth to continue the lines in the north and south started by South Australia. New South Wales and Queensland, however, claim that both strategically and commercially a line connecting the eastern cities with Port Darwin would possess paramount advantages over that running north and south. It is intended in this article briefly to outline the arguments that have been brought forward to support this point of view.



MAP OF AUSTRALIAN RAILWAYS

Sydney, though the Commonwealth Constitution provides that it cannot be the political capital of the Commonwealth, is undoubtedly the commercial capital. The population is even now well over 600,000 and is increasing more rapidly than that of any other Australian city. Similarly New South Wales is the most populous and wealthiest of the Australian States. When the citizen army is fairly established it will be in New South Wales that the greatest number of troops will be available for despatch to any threatened point. As the north is the only quarter from which danger is apprehended it is argued that a line as direct as the topographical features of the country will permit should be constructed between Sydney and Port Darwin. Similarly it is claimed that commercially such a line would be more profitable than that running north and south. Passenger and goods traffic would necessarily be heavier between Sydney and Port Darwin than between Adelaide and Port Darwin.

The Governments of New South Wales and Queensland have agreed to join forces to ensure the construction of the line running from Bourke to Hungerford on the southern boundary of Queensland, thence to Camooweal on the western boundary and from Camooweal to Pine Creek. The first section would be constructed by New South Wales, the second by Queensland and the third by the Commonwealth. The distance between Bourke and Hungerford is 120 miles and the country is generally flat. The Queensland Parliament has already authorised the construction of the line from Tobermory to Camooweal and has tacitly agreed to bridge the gap between Tobermory and Hungerford. The section left for the Commonwealth to construct, that between Camooweal and Pine Creek, is about 640 miles in length.

If the north and south route were adopted the Commonwealth would have to construct 1,067 miles of railway through mostly desert country. But passengers and goods traffic from Melbourne, the second most populous city in

the Commonwealth would benefit, as the distance from Melbourne to Port Darwin by the Adelaide route would be 2,379 miles, against 2,463 by the Sydney route. This route would therefore probably be favoured by the Government of Victoria, but the difference in length is so trifling that the advocates of the line from Sydney feel convinced that its other advantages will secure its endorsement by the Victorians.

It may be of interest briefly to recapitulate the main arguments which have been advanced in support of the Sydney-Tobermory-Port Darwin route:—

The largest centre of population, Sydney, would naturally supply the largest number of citizen soldiers, and if connected with the far north by a direct route, in time of war would be able to render most assistance.

In time of war Sydney being the most important of the State capitals, may stand in the greatest danger of being attacked, and that at a time when large numbers of the Australian soldiers might be massed in the Northern Territory. The most direct route for the transport of troops would then be of the greatest value.

could reach Port Darwin by 1,950 miles travelling, as against 4,084 miles if they had to travel via the Adelaide route.

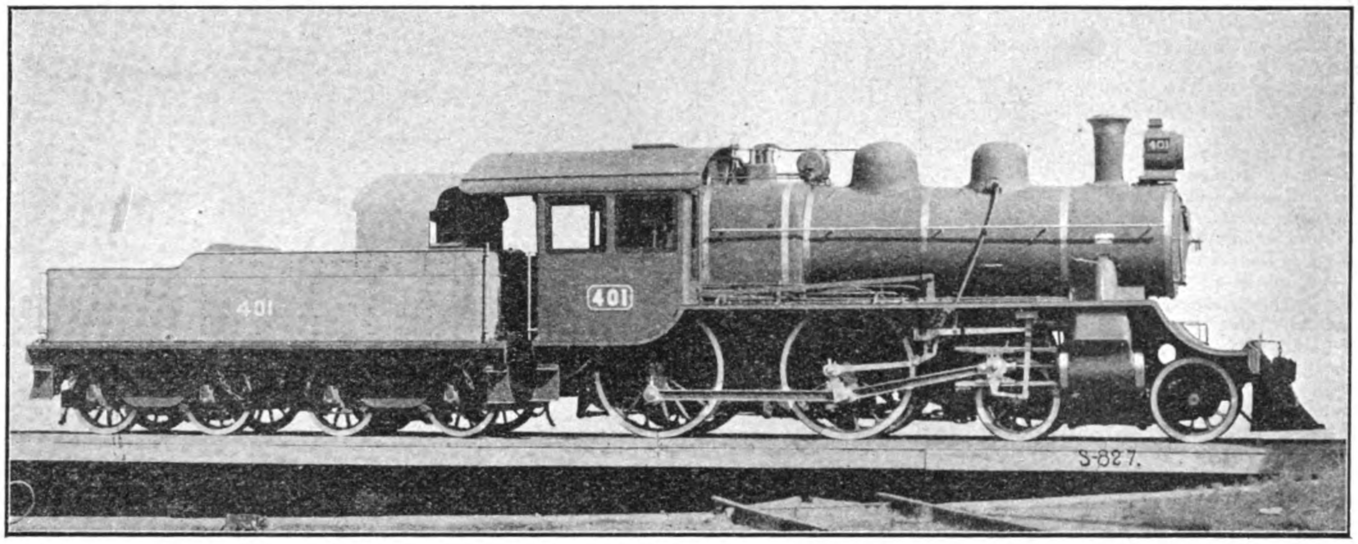
If the Sydney route were adopted it would best serve, taking the last census returns, the population of New South Wales and Queensland, numbering 2,252,547, as against the population of Victoria and South Australia, numbering 1,724,109.

If the route via Adelaide and Codnadatta were taken it would be for 1,067 miles (which has yet to be made) through mostly desert country with only in parts 4½ in. average rainfall per annum and consequently capable of very little production of traffic. If the Sydney-Bourke-Camooweal scheme were adopted it would be found that for nearly the whole distance the line would traverse excellent pastoral country, with in no case a rainfall as low as 4½ in.

If the Sydney route were adopted the Federal Government would only have to make about 640 miles of railway as against 1,067 miles if the Adelaide route were adopted.

The distances given are approximate, but are near enough for all practical purposes.

When General Chan Kwing Ming was a member of the Provincial Assembly under the old Government, he laid before the Assembly a proposal to build a railway from Canton City to Chiuchow, and Mr. Cheung Pat Sze, a well known millionaire, engaged a European engineer to make a survey of the line. As this was too big a task to be brought to a successful conclusion, as merchants were handicapped by the red-tape proceedings of the mandarins, the question was put off from time to time. As soon as Mr. Chan Kwing Ming came into power he caused the question to be revived. He put the matter in the hands of Mr. Chao Ching Hua, managing-director of the Canton-Kowloon Railway, and Mr. Shing King Hsun, managing-director of the branch line of the Canton-Hankow Railway to canvass for shares. It is proposed to float a company with a capital of twenty million dollars and the railway is to connect the Canton-Kowloon Railway at Shek-lung at one end, and the Chiuchow-Swatow Line at the other, passing through Waichow, Hoifung Jukfung and other districts at Chiuchow. It is believed that as soon as this line is



Eight-wheel Express Passenger Locomotive recently built by the American Locomotive Co. for the Imperial Government Railways of Chosen. This locomotive is hauling a load of 245 tons, behind tender, over one per cent grades at speeds of 35 and 40 miles per hour Its principal dimensions are as follows:—Cyls. 18"× 26", Diam. of driving wheels 72". Heating Surface 1397 sq. ft., Grate area 25.2 sq. ft. Tractive Power 17,900 lbs. Weight on drivers 72,200 lbs., Factor of adhesion 4.03. Tender Capacity 3200 Imp. Gals. 300 cu. ft. coal.

The direct route to Sydney would provide the setters in the north with their best market.

Sydney being the most populous and wealthiest centre of Australia, if connected by a direct route, would furnish more capital and enterprise for the settlement of the north than any other centre of population in Australia.

Sydney being the greatest commercial city of Australia would naturally for that reason and from its geographical position, do most trade with Java, Singapore, China, Japan and other Eastern markets. Its direct connection by rail with Port Darwin, the last port of c ll for steamers in the north, would therefore be of great service.

If the through line goes from the principal centre of population and through the best country practicable, it would enable those who work it to provide the quickest and best train service, and the route that has the quickest and best train service will attract the most traffic, and be of the most service in the transport of mails to the north and east.

If the line were made from Sydney the distances by rail from the principal centres of population would be as follows:—

First, from Sydney via Bourke, etc., to Port Darwin would be 2,173 miles, as against 2,966 miles if the route is via Adelaide. Second, if the Sydney through route is adopted, Brisbane by rail to Port Darwin would be 2,005 miles, as against 3,691 miles if the Adelaide route is adopted. Third, if the Sydney route were adopted passengers by train from Rockhampton

CHINA

Sunning-Kongmoon Railway.—The extension of the Sunning Railway in Kwangtung Province, China, to Kongmoon has been completed.

The road is now 67½ miles long, from the river port of Kongmoon to the internal of one of the richest portions of the Pearl River delta. It has been constructed by Chinese without foreign assistance, much of the money for the railway being furnished by Chinese in the United States. Its equipment at present consists of 7 American and 5 German locomotives, 18 passenger coaches built in America, and about 70 box cars and about 70 flat cars of the usual American model, most of which have been constructed in the United States. The extension of the railway north from Kongmoon and eventually to Canton and south from Sunning City to the sea is to be undertaken as soon as affairs in this portion of China return to normal. The company owning and operating the line may be reached through Mr. Chin Kee Hee, president of the Sunning Railway Co., Hongkong or Sunning City.

Canton-Swatow; Project.—Our Canton correspondent, writing on May 9 says the South China Post states that a project is on foot to construct a railway connecting Canton and Swatow.

completed the Canton-Kowloon Railway will become more of a paying concern.

Canton-Hankow Railway.—Arrangements have been completed for the beginning of survey on the Wuchang-Yochow section of the Canton railway, and it is expected that the first survey party will be out early this week. Other parties will follow as soon as camp equipment arrives from Shanghai. It is expected that this part of the work will go through rapidly as there will be three parties out, each with six foreign engineers. In addition twenty native engineers will be engaged—five who passed the examination last year as assisted engineers, and fifteen others as student engineers.

Shantung Railway Co.—Berlin, May 1.—The Shantung Railway Company has declared a dividend of 6 per cent., preferential shares receiving a further dividend of 5 per cent.

CANTON-MACAO RAILWAY.

The destiny of the Canton-Macao Railway lies with a group of local Chinese, who are now advertising in native papers for capital with fair success. The route has already been surveyed and it is probable that construction work will be commenced at an early date. Starting at Fati, across the river from Canton, the line will run almost due south, through the districts of Shuntak and Heungshan, to the boundary

of the Portuguese colony of Macao. It will be about 70 miles long and will penetrate one of the richest districts of South China.

The country through which it passes is low lying, intersected by innumerable creeks and given over to rice, fruit, and vegetable culture. A 30-mile branch will connect the main line at Chentsun with the Sunning Railway at Kongmoon, via Kaukong.

TERRITORY SERVED—EXPORTS AND IMPORTS.—There are no very large cities on the railway, but there are innumerable villages and several towns of 10,000 to 50,000 people, among which may be mentioned Chentsun, Shuntak, Heungshan, Chingshan, Kamchuk, and Kaukong, the last two of which are ports of call for foreign steamers plying on the West River. The southern terminus of the main line will be within 5 miles of the new commercial port of Heungchow, now in process of construction, and will undoubtedly have some effect in hastening the completion of that pretentious scheme.

The people of the Shuntak and Heungshan districts are wideawake and progressive, and have come under the influence of a large number of Chinese returned from abroad. There are probably no richer districts agriculturally in China.

So dense, however, is the population that large quantities of rice have to be imported from abroad to help out the local crops. Sugar cane is grown on a considerable scale and turned into brown sugar for local consumption and export. Among the other manufactured articles exported from the districts touched by the railway are palmleaf fans, mats and matting bags, groundnut, cassia, and bean oil, samshu, coarse chinaware, paper, and firecrackers. Animals shipped alive for slaughter, poultry fresh and preserved, fresh fruit, dried and salted turnips and other vegetables, native medicines, and firewood may be said to complele the list of major exports.

The principal imports are kerosene, cotton and woollen piece goods, raw cotton and cotton yarn, matches, timber, metals, coal, saltpeter, foreign clothing and hats, shoes, umbrellas, sugar, dried and salted fish, flour, vermicelli, and macaroni.

TRADE EXPANSION.—The natives of this section originally used, and to some extent still use, groundnut and other native oils for illuminants, but the steadily increasing sales of kerosene point to an early disappearance of the native article. The market for cotton piece goods is considerable, but apparently not growing. The people prefer native woven cloths for all uses to which they can be put, and the steady increase in the number of cotton mills in China, supplemented by innumerable hand looms, bids fair to make any expansion in the local market improbable. There is, however, a good market for foreign-made clothing, hats, caps, and other haberdashery, shoes, etc.

The taste for things foreign is not confined to clothing but extends to many articles of personal adornment and to condiments and provisions, including tinned fruits, vegetables and meat, wines and liquors, cigars and cigarettes, and condensed milk. A small cigar factory, using locally grown leaf, has recently been started in the territory served by the railway, a factory for putting up a local fish has been operated for some time in Macao, and several factories for tinning rice-birds, bamboo shoots, and lichees, carambolas, and other Chinese fruits have been erected within short distances of the line.

At the present time the only means of transportation and communication are boats on the innumerable creeks which intersect the delta, and wheelbarrows on the little paths which delimit the paddy fields. Both of these will remain as valuable feeders to the railway, but they will pass out of existence as means of communication between intermediate points and termini. The district draws upon Canton, Macao, and Hongkong for its foreign goods, and the completion of the railway will bring all these places incomparably nearer to it. The new line will also afford the people a wider market for their fresh fruit, vegetables, eggs, and other perishable articles. (C. R.)

THE CANTON-AMOY RAILWAY.

The construction of a railway from Shekwan, across the East River from Shek Lung on the Canton-Kowloon Railway, to Amoy has been under consideration for a number of years, and in 1906 a survey of the route was made. The line is to be built by Chinese syndicates representing the people of the two Provinces through which it will pass—Kwangtung and Fukien. No advance has been made beyond the survey of the line, and it is probable that some years have still to elapse before construction work actually commences. The line will have a length of 275 miles in Kwangtung and about 100 miles in Fukien. It will penetrate a thickly populated country in a high state of cultivation, and will bring rail communication to several important cities now served only by inferior waterways.

The western terminus, Shekwan, is a busy town of some 10,000 people, drawing its importance from its situation at the apex of the East River delta, opposite Shek Lung, which has a population of about 20,000. It shares with Shek Lung in the distributing trade of the delta and of a large area along both sides of the river to the east. The country about it is fertile and is devoted largely to the cultivation of rice, and bananas, lichees, and other fruit, and sugar and cattle and swine raising. From Shekwan the route follows a general easterly direction, through Waichow, to Louk Fong, and then striking north-by-east touches Kityang and Chaochowfu. From the latter place it takes at first a southeasterly and then a northeasterly direction to Wong Kong on the Fukien border. At Chaochowfu it crosses the Swatow-Chaochowfu Railway, giving it rail connection with the sea at that point.

A POPULOUS DISTRICT.—The first important city reached after leaving Shekwan is Pok Lo (with 100,000 inhabitants), whose trade has been overshadowed by that of Waichow which has a population of 300,000. At Waichow the East River turns abruptly to the north and runs for over a hundred miles through broad and fertile valleys, thickly settled and well cultivated. To this fact is largely due the importance of Waichow, which serves commercially both this valley and that south of the river. The principal products of this section are rice, fruit, swine, and poultry. Small craft feed the city's trade from the north, while boats drawing up to 3¼ feet can reach Waichow from the delta except during the season of low water. The completion of the railway will doubtless be followed at an early date by the opening of Waichow to foreign trade, as provided for in the British commercial treaty of 1902.

The line leaves the river at Waichow and runs to Hoi Fong through a hilly country interspersed with valleys and dotted with towns and villages. Of the latter only Ping Sang, Sam To Chou, Ko Tam, and Kung Ping need be mentioned. These are market towns, each serving its little valley or two and each with a population of about 10,000. Hoi Fong and Louk Fong are walled towns of 10,000 inhabitants each; both can be reached from the sea by small junks. All the way from Waichow to Louk Fong fruit, rice, and cattle are raised and small timber cut. At Louk Fong the line turns to the northeast and after passing Kwoi Tam, a walled market town of 10,000 people, and Pou Ning, a walled city of 100,000, reaches Kityang. This section is through more level country where cattle, pigs, poultry, and water buffaloes are raised; and rice, fruit, grain, and sugar grown.

MANY SMALL TOWNS ALONG THE ROUTE.—Before Pou Ning is reached the country becomes thickly dotted with small villages and towns. It is a rich agricultural district. The city of Pou Ning lies on a tributary of the Swatow River and is accessible by small craft. Its importance is overshadowed by that of Kityang, however, which stands on the river itself and can be reached by boats drawing up to 10 feet. Kityang, with a population of 400,000, is a walled city upon which a large area to the north depends for its supplies, which this city in turn gets from Swatow.

From Kityang the line passes through a well-cultivated district to the prefectural city of Chaochow, population 500,000, situated on the Han River and connected with Swatow by a short railway constructed some years ago. Chaochowfu is an important collecting and distributing center for the Han Valley and considerable areas on both sides of it. Its foreign port is now Swatow, but with the completion of the line from Canton it will be able to draw easily upon Amoy as well as upon Hongkong and Canton itself.

There are no further important towns until Wong Kong is reached. This city with a population of 60,000, lies just within the provincial border and has a considerable trade in oranges and other fruit, indigo, vegetables, rice, sugar, cattle, and dried fish. It has water communication with the sea for craft drawing up to 1 foot only. The railway should find a market for its produce at Amoy, Chaochowfu, and Swatow.

WHAT THE RAILWAY MEANS TO TRADE INTERESTS.—It will have been observed that practically all the country through which the line from Canton to Amoy passes is agricultural, and so far without important manufactures; that, in other words, the purchasing power of the people is dependent upon the success with which they market the produce of the soil. The slow transport service offered in the past by native boats has made it impossible to go any distance from the fields to market and has seriously restricted the area of sale. It stands to reason that when Chaochowfu and other places along the line can ship their perishable fruit, vegetables, etc., to Canton, Hongkong, and Amoy by rail in a shorter space of time and more cheaply than they can now ship them a tenth of the distance by boat, only indifference on the part of the people themselves can prevent the inauguration of an era of increased prosperity.

It will have been observed, too, that the people who will be served by the railway, while able to feed themselves on fruit and vegetables, are dependent upon others for their clothing, many foreign articles of food, cotton and cotton yarn, illuminating oil, and coal (where it is used for fuel) besides many other articles known as sundries. These are now obtained from the open ports of Swatow and Canton or direct from Hongkong by junk at, in every case, a much greater expense than would be involved in importing them by rail. The people of this section have taken kindly to many foreign articles—some necessaries, some luxuries; and, given a greater purchasing power, there is every reason to expect an increase in the demand for foreign imports. (C. R.)

CHINESE RAILWAY PROJECT

At the instance of the consulate general in Hongkong, several American manufacturers of railway material have sent a representative to Mengtze and Yunnanfu (both cities in the Province of Yunnan), and two important locomotive companies also have men on the ground, in connection with the contract to construct the proposed line from Yunnanfu to Lanchowfu, on the Yangtze River, in the Province of Szechwan. The matter of freight rates, however, over the French railway from Haifong, in French Indo-China, to Yunnanfu, is of such controlling importance that the projectors of the line are seriously considering the construction of a line from Yunnanfu to Nanning (on the Yoo River in the Province of Quang Se), as a means of avoiding these excessive charges, as well as opening up the Province of Yunnan and west China by the new route. This road would give communicatien by rail and water with Hongkong and Canton.

This enterprise is not exactly an alternative of the construction of what is known as the Szechwan Railway, but it seems to be generally understood that the construction of the Railway to Nanning will postpone the construction of the line from Yunnanfu to the Yangtze. The survey work of the line to Nanning is now (November, 1911) being rapidly completed and the immediate construction of either the Szechwan Railway or the line to Nanning seems to depend entirely upon the early settlement of political disturbances in China generally. The detailed survey of the line from Yunnanfu to Lanchowfu, under the direction of two American engineers, is also rapidly nearing completion, the preliminary work already having been disposed of.

TRADE ROUTES INTO YUNNAN.—Hongkong importers who expected a revolution in the trade of Yunnan and Kwangsi Provinces in South China as a result of the operation of the railway from Haifong to Yunnanfu, have come to the conclusion that under present conditions much of the expected expansion will prove impossible. There has been a considerable increase in some lines of trade into and from these Provinces, but the increase has been due, to some extent at least, to generally improved conditions and mining and other internal development in the Provinces, and in spite of drawbacks due to railway conditions. The usual direct results of railway service have been minimized by interrupted service, troublesome customs and other charges, and particularly by high freight rates.

In spite of the opening of the railway, goods are still imported into Yunnan, Kweichow, and west China by rail through Burma, thence by pack train to Bhamo and on to Tengyueh, and then to Batang, about 400 miles north, or to Talifu, and even to Yunnanfu, whence the goods are distributed all over that part of the country, as they have been since the beginning of the trade. These costly means and tedious routes are used in spite of what would seem to be the manifest advantages of the rail route to Yunnanfu or to intermediate points and thence by the natural caravan routes to various points in the Province and west China.

The expected change in the direction of these imports has so far not been realized, and present indications are that the railway transportation charges over the line to Yunnanfu will have to be modified before any change can be reasonably expected. These charges bear with particular weight upon all great undertakings for the development of the country like railways, mining enterprises, factories, and, in short, all enterprises which require heavy machinery and a reasonable rate for the transportation of supplies or output.

INTERRUPTED RAILWAY SERVICE—HIGH FREIGHT RATES.—The construction of the line into Yunnan has been too light for the nature of the country, the result being that the operation of the line has been interrupted between French territory and Yunnanfu for the greater portion of the time. Rainfall in some portions of the territory traversed is particularly heavy and the grades have been established largely by the use of a peculiarly light decomposed granite which has readily been swept away by floods. It has become evident that considerable work in reconstruction will have to be done before regular and uninterrupted service on the railway can be relied upon. This, of course, has had considerable effect in restricting the use of the railway and in retarding the development of the country.

The chief cause for the latter, however, is in railway rates. These rates are upon five classes of freight and are assessed upon the basis of five zones between the seaboard at Haifong and Yunnanfu. The rates are based upon considerations of comparative value and comparative bulk of goods as well as weight, and in general follow similar classifications in France. They vary from 11 to 26 cents local currency (4.73 cents to 11.18 cents gold at present exchange) per metric ton (2,240 pounds) per kilometer (0.62 mile) for the higher class of goods to 4 to 10 cents local currency (1.72 to 4.3 cents gold) per metric ton per klometer for the lowest class of goods. To the present rates a surtax of 10 per cent is now added on the ground that exchange is low, but this surtax will be removed when the local dollar will equal 50 cents gold. On the basis of the rates fixed in the regular tariff the charges on the different sections for the several classes of goods amount to the following in gold dollars per metric ton:

Sections	Distance	Class 1	Class 2	Class 3	Class 4	Class 5
	Miles					
Haifong to Yenbay	104	$11.73	$9.60	$9.60	$5.33	$4.23
Yenbay to Lao-kai	87	7.28	5.92	4.58	3.64	2.73
Lao-kai to Mengtze	111	19.90	16.67	12.25	9.95	7.65
Mengtze to Annchou	27	2.40	1.95	1.48	1.20	.93
Annchou to Yunnanfu	152	13.65	11.02	8.40	6.82	5.25
	481	54.96	44.56	36.31	26.94	20.82
Surtax	....	5.50	4.45	3.63	2.69	2.08
Total	....	60.46	49.01	39.94	29.63	22.90

EXTRA FEES.—The rates on various classes of goods from Haifong to Yunnanfu, therefore, a haul of 481 miles, range from about $23 gold to over $60 gold per metric ton. To the rate of $23 to $60 per ton from Haifong to Yunnanfu, the railway company adds a charge of about $3 local currency, or $1.30 gold, as a "customs" charge, which seems to be designed to cover the clerical expenses of clearing goods through the Indo-China and the Chinese customs. The charge has, however, no actual connection with the customs duties, and is independent of the duties levied either in China, where 70 per cent of the usual Chinese customs duty is collected or in Indo-China, where 20 per cent of the full import duty on goods from abroad is collected as a transit tax on goods thus entering China. The freight rates above given are modified somewhat by rates for carload lots, but are increased for goods of a dangerous nature, considerable quantities of which are used in railway construction and mining enterprises.

In addition to freight on the long ocean haul from the United States to Haifong, the freight on rails from Haifong to where they are needed is about 150 per cent of the actual price of the rails in the United States.

INDO-CHINA AND SOUTH CHINA RAILWAYS.—The project of Chinese governmental authorities and Chinese business men to connect the interior of Yunnan and Kwangsi Provinces with the seaboard by a railway from Yunnanfu to or near points more or less within the vicinity of Nanning, on the West River, as an alternative route to the route now had by rail through Indo-China and over the French railway into Yunnan, is likely to be hastened by plans of French railway interests in connection with trade now handled through the Chinese port of Lungchow and thence down the West River. According to the annual report of the acting commissioner of customs at Lungchow, Mr. P. C. Hansson, just published, "French aspirations to extend their Hanoi-Langson Railway to Lungchow and Nanning would appear to have been definitely abandoned." The commissioner continues:

The line is, instead, to be pushed through French territory to Nasham, the uppermost navigable point on the Sungki River, which flows down past Lungchow. Farther down the river is a place called Binhdao by the French, Pingtu by the Chinese. Between this and Nasham the river makes a large bend, forming a sharp angle, with its top near Thatke; and it is urged in the Tongking newspapers that by extending the railway the few miles across from Nasham to Binhdao a saving in time of forwarding goods corresponding to the time it takes the junks to navigate the tortuous bend —at least four days on the upward journey and two days downstream—will be effected; also that Binhdao will then become the "real port" of Lungchow. The pushing of the Hanoi-Langson Railway to a point on the Sungki River reachable by junks was advocated as far back as 1889 by Mr. Commissioner Carl as a means of capturing the trade flowing down the West River from these parts, Poseh, and Nanning. Since then, however, great improvements have been effected in the West River route, a number of likin barriers have been removed, Wuchow and Nanning have been opened to trade, and a flotilla of motor boats now complete for the growing traffic above Wuchow. In oder to deflect part of this trade via Tongking, shallow-draft motor boats would have to run in connection with the railway, and cheap freights and the most liberal transit facilities by the Tongking authorities would be a sine qua non. Whether all this will be done remains to be seen.

FERTILE LAND AWAITING CULTIVATION.—The present trade involved in the development of either of these routes is almost altogether with or rather through Hongkong, but it is not large, and there is little hope of any material increase in it until there has been that development of the country by improved means of transportation these various plans promise. It is a fact of much significance in Chinese affairs that there are great tracts of land of fertility and promise in Kwangsi and Yunnan which are not peopled or cultivated. The commissioner says of this phase of the situation:

The country is very sparsely populated, large tracts of land lying idle; a steady flow of settlers would be wanted to remedy this. To induce emigrants from Kwangtung to come here, rather than allowing them to depart for foreign countries, should be a task of national importance to China. First of all, however, improved means of communication within the Province would be necessary.

The completion of the French route to the river at Nasham or of the Chinese route to the river at Nanning or Poseh will open up a territory which is now practically valueless. The experience of the railway to Yunnanfu has, however, been that unless the railway rates are low the full effect of its construction and operation cannot be realized.

In the meanwhile and until the breaking out of the revolution in China motor-boat service on the rivers west and northwest of Nanning to Poseh was maintained and increased considerably. It will doubtless continue to be the most approved means of reaching this territory until railway service is finally realized.

KIRIN-CHANGCHUN RAILWAY.—Viscount Uchida's reply to the interpellation of Mr. Shiro Shiba, in the House of Representatives March 7th, 1912.

"What is the policy in relation to the Kirin-Changchun and Kirin-Hoiryong lines of railway in South Manchuria?"

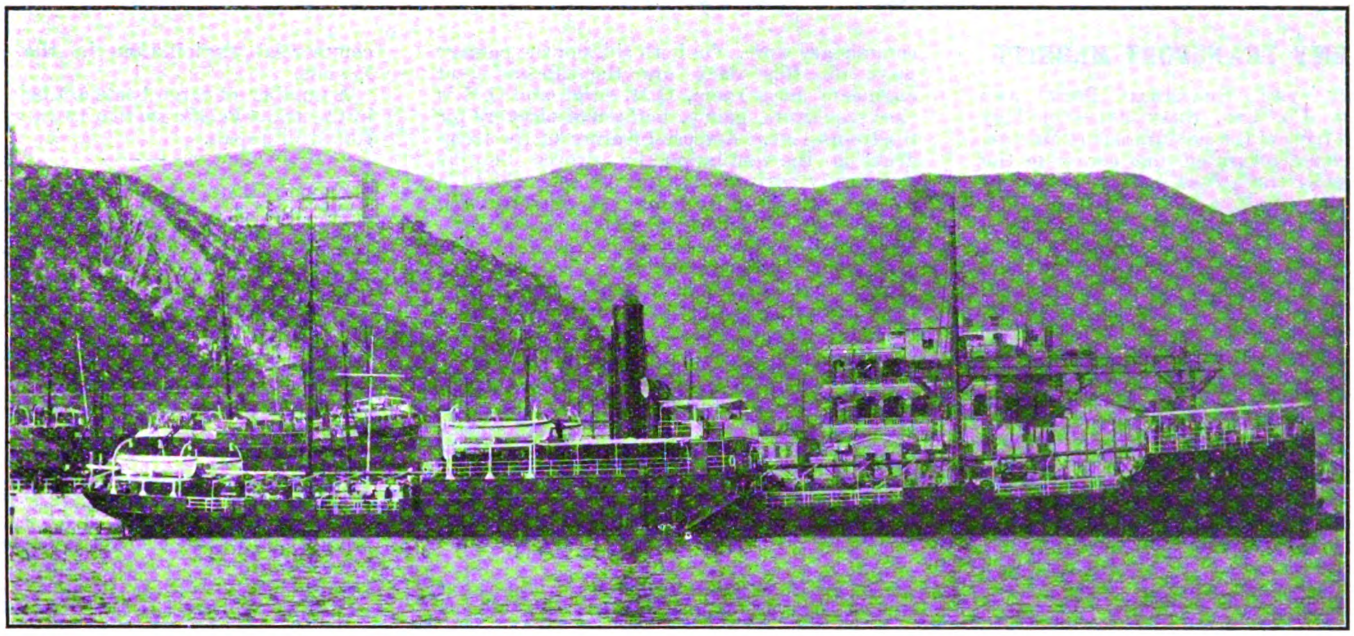
"The Kirin-Changchun line was to be constructed by China, and a connection made with the Japanese line. The construction was suspended by the outbreak of pest. An able manager of the undertaking had been difficult to find, while the Chinese officials and specialists engaged under a poorly qualified manager showed little skill and experience in the work. These defects were common to other railway lines undertaken by Chinese and not special to this line. Besides, the provisions for the position and power of the Japanese experts were defective, and this fact hindered their full activity. The line was an expensive one, having already absorbed 3,000,000 yen; but more than half its length had been completed, and only 33 miles were left incomplete.

In reference to the Kirin-Hoiryong line, the time for commencing its construction was to be fixed by the Chinese Government, after consulting with the Japanese authorities. A delay caused the Japanese Consul at Mukden to make inquiries and carry on negotiations with the Viceroy of Mukden. But the outbreak of the present disturbance put a sudden end to the affair."

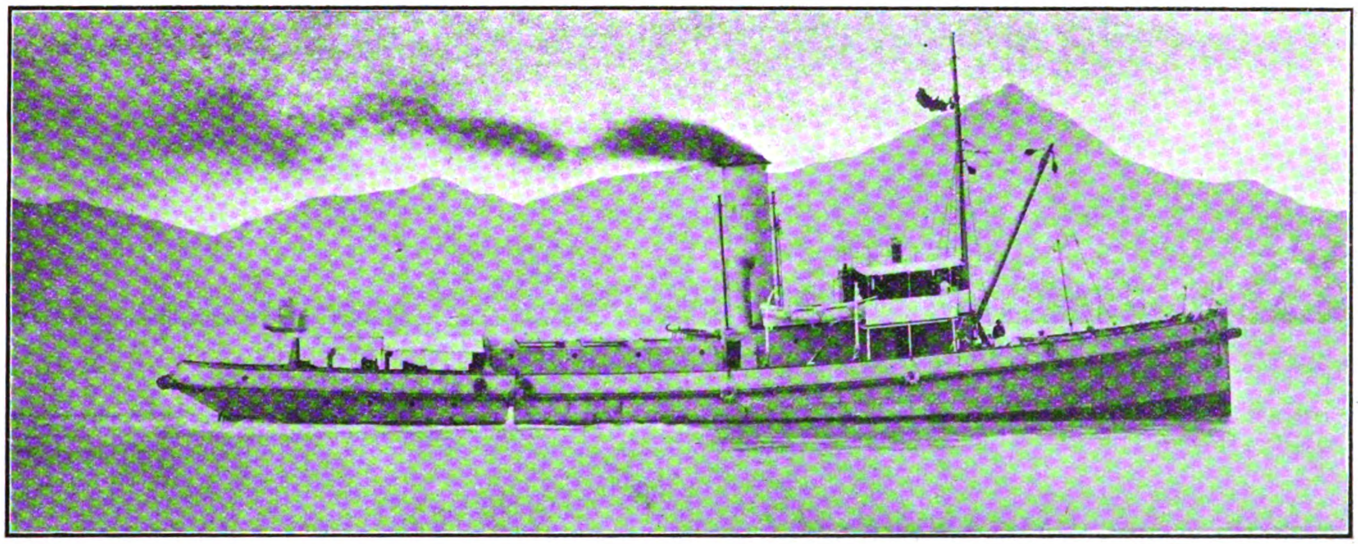
MUKDEN.—With reference to the agreement made last fall between the Japanese and Chinese authorities here for the extension of the track of the Imperial Railways of North

(*Continued on page 31*)

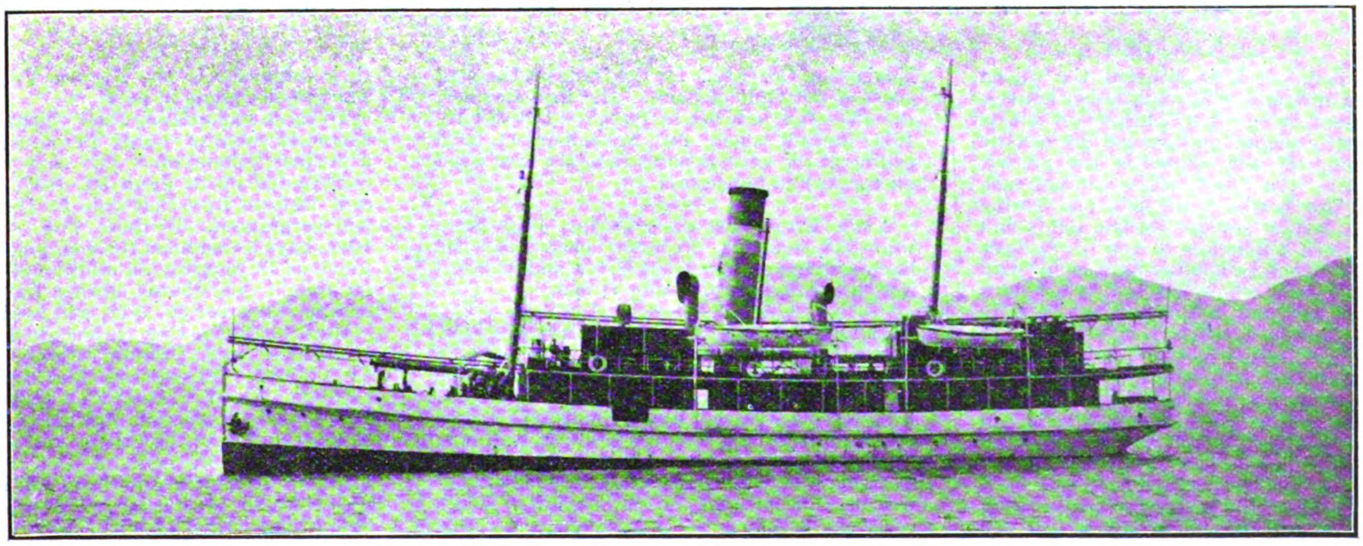
NEW STEAMERS BUILT BY THE TAIKOO DOCKYARD & ENGINEERING CO. OF HONGKONG, LTD.



STEEL SCREW STEAMER, "TENCHO MARU" BUILT FOR THE SOUTH MANCHURIA RAILWAY CO.
Length overall, 255 ft.; Beam 36 ft.; Depth 16′ 6″; Gross Tonnage 1,276 Tons; Speed, 11 knots.



STEEL TWIN SCREW TUG "TAIKOO" BUILT BY THE TAIKOO DOCKYARD & ENGINEERING CO. OF HONGKONG FOR THEIR OWN USE.
Length overall, 150′ 0″; Breadth, 26′ 6″; Depth Moulded, 13′ 6″; Gross Tonnage, 353 Tons; Speed, 13 knots.



STEEL TWIN SCREW STEAMER "MILEY" BUILT FOR THE U. S. ARMY QUARTERMASTER'S DEPARTMENT, MANILA, P.I.
Length overall, 140 ft.; Beam, 26 ft.; Depth, 13′ 6″; Gross Tonnage, 360 Tons; Speed over 12 knots.

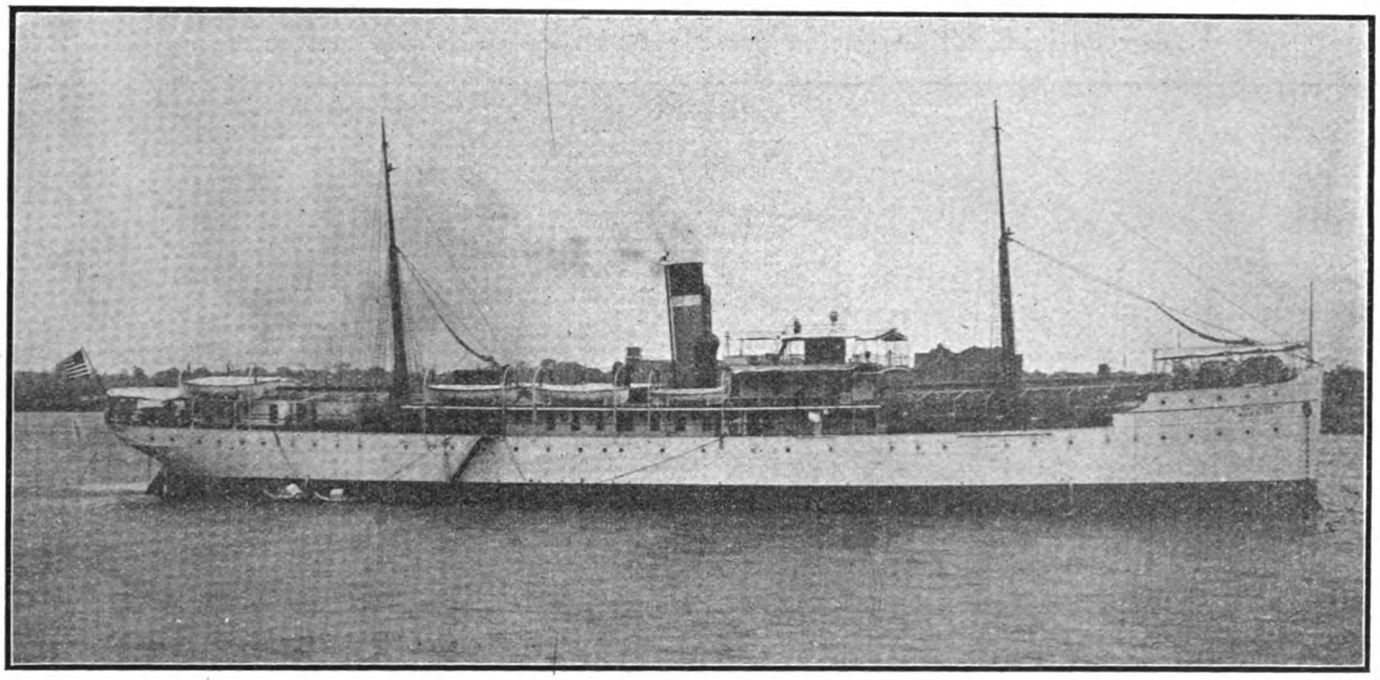
SHIPBUILDING NEWS

U. S. ARMY TRANSPORT MERRITT

Built by the Shanghai Dock and Engineering Co. Ltd. Shanghai.—On May 10, the trial trips of the new transport Merritt, were held over a measured mile course in the lower Yangstze, three runs with the tide, and three against.

The conditions stipulated the vessel to have about 900 tons dead weight on board and a full complement. This was suppli d by bars of pig iron. The mean speed developed over the measured mile was $13\frac{3}{16}$ knots per hour, which was most satisfactory. After this the vessel was tried in turning and she answered her helm splendidly and make two complete circles, turning each time in her own length. The ship's greatest success was in a four hours' continuous run when the total distance registered 53 knots. A mean speed of $13\frac{1}{4}$ knots was maintained, this being $\frac{3}{4}$ of a knot over the contract speed of $12\frac{1}{2}$ knots. These results were entirely to the satisfaction of the builders' and the government representatives.

A full description of the vessel was published in the February issue of this paper, at the time of the launching.



UNITED STATES ARMY TRANSPORT "MERRITT," BUILT BY THE SHANGHAI DOCK & ENGINEERING CO., LTD.

On the main deck is situated the saloon fitted in white and gold and leather settees, the apartment being lit by clusters of nickel plated electric lights and cooled by electric fan. Opening off the saloon is the pantry. Then come the first class cabins each containing two berths with hair and spring mattresses, leather settees, electric lights and fans, and toilet appliances of the U. S. Navy pattern. At the end come the bath rooms with hot and cold water, showers, etc. At the stern is the sick bay and hospital with Doctor's office, operating room, baths, berths, etc. On the same deck is situated the Quartermaster's office and sleeping apartment. Forward are the crew's quarters. On the bridge deck the Captain and Officers have their quarters. On top of the chart room there is a powerful search light. On the boat deck there are ten boats and two life rafts. In the orloop deck there is a special cold storage and refrigeration plant having a capacity of 200 tons of frozen meat, etc. On the troop deck there is accommodation for 350 soldiers and non-commissioned officers. Amidship there is the commissary store. On both sides of the passage ways on this deck are the officers' and engineers' mess room, Q.M. Sergt. and Q.M.'s clerks quarters, galley, baths and showers for the troops, etc. A special feature of the troop deck is the ventilation by sirocco blowers electrically driven by means of which a constant supply of fresh air is supplied through metal shafts which draw the pure air from accumulating chambers. The vessel is twin screw, her contract speed being $12\frac{1}{2}$ knots. She is also fitt d with powerful winches and booms for the hoisting of guns and ammunition, etc.

Japan.—Yokohama merchants are asking for the establishing of better steamship connections between Japan and South America. It is proposed to increase the subsidized service of the Toyo Kisen Kaisha to the west coast of South America and to extend the service to Brazil on the east coast. The merchants report increasing Japanese trade with these South American countries.

Siam.—The Straits Steamship Co. (Ltd.) has started competition with the Siam Steam Navigation Co. (Ltd.) for the trade on the west coast of the Gulf of Siam. The first steamer, the *Poh Ann*, arrived in Bangkok October 16, 1911, sailing again on November 11, and calling at the various ports along the west coast on the way to Singapore.

Amur River Vessels.—During 1910 there were 218 steamers, 23 motor boats, and 292 barges plying on the Amur River and tributaries, the deepest draft being $4\frac{1}{2}$ feet.

Arctic Navigation Possible.—Capt. Webster, of the British yacht *Nimrod*, who made a successful attempt during 1911 to reach the mouth of the Yenisei River via the Kara Sea, has presented to the Russo-English Chamber of Commerce at St. Petersburg valuable information, which proves that regular steamship communication can be maintained between western Europe and the ports on the Arctic coast of Siberia.

Japan, Shipping Items.—A Japanese steamship company is being organized to further commercial exploitation in the South Sea Islands.

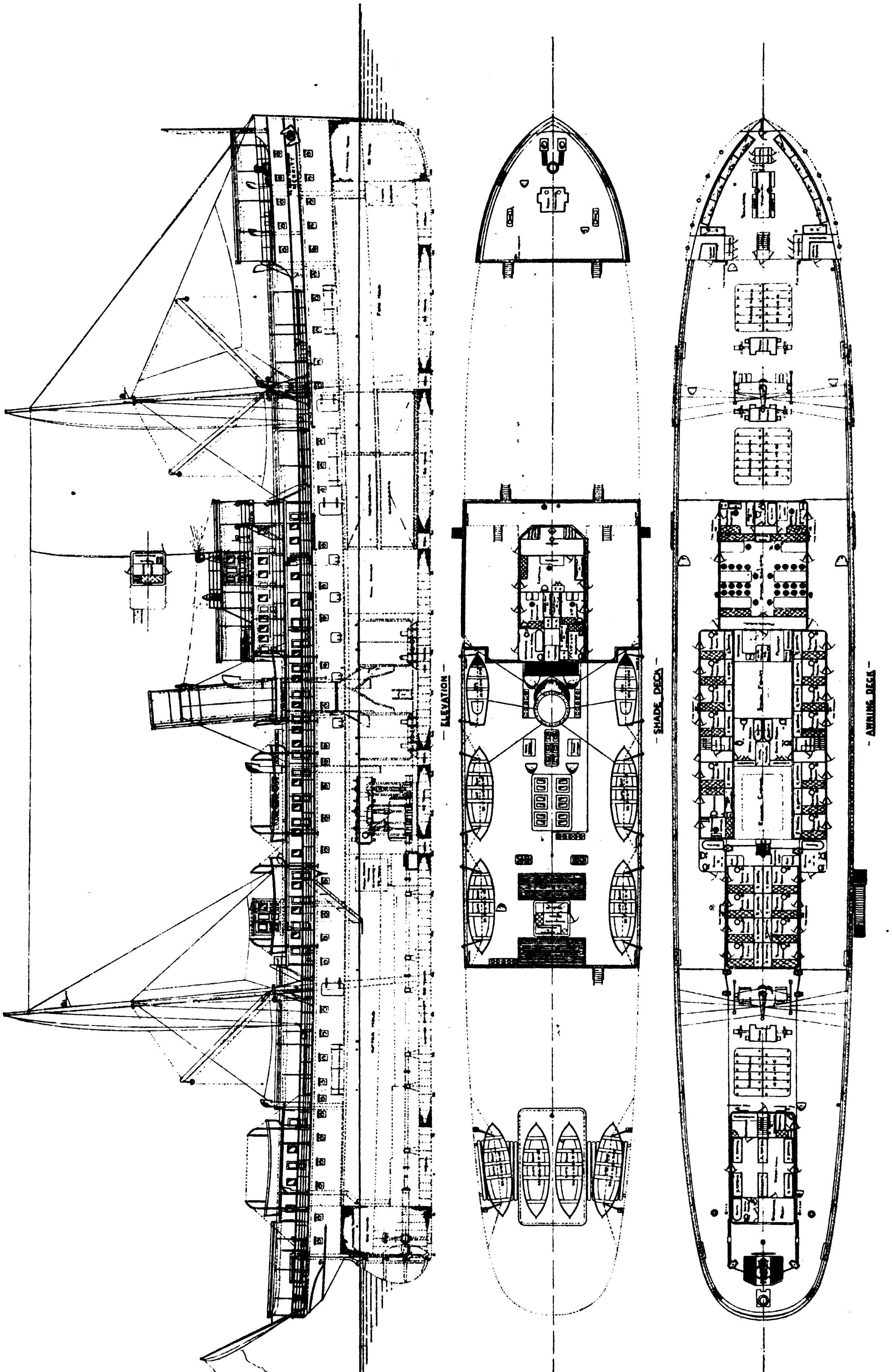
A number of cargo boats are being chartered in the trans-Pacific service to carry American cotton to Japan.

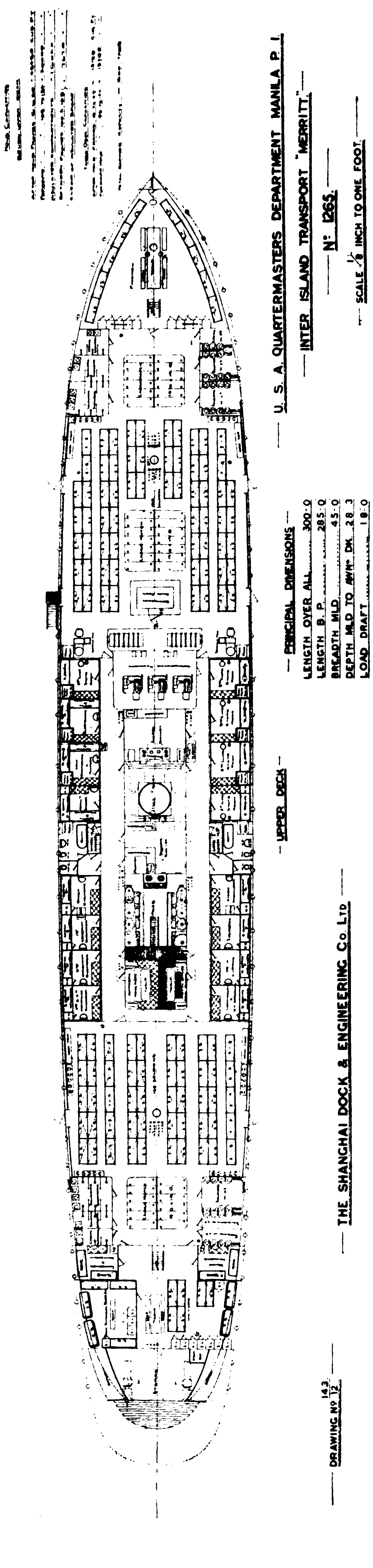
French Mail.—It is announced in Eastern ports that as a result of extending the mail subsidy contract with the company by the French Government for 25 years the Messageries Maritimes service to China and Japan is to be increased. There will be a complete semi-monthly service of ships of the *Paul Lecat* type (the *Paul Lecat* being the 16,820-ton vessel now under construction for this service). The vessels will have a speed of 18 knots and accommodations for 500 passengers.

Conference Rebates.—A circular sent to firms dealing with the Shipping Conference announces that a rebate of 5 per cent on the freight paid will be granted to those exporters from Singapore, Penang, and the Malay Peninsula to Europe, or to ports via Europe, who from January 1 to June 30, 1912, confine their shipments to the Nippon Yusen Kaisha The circular reads in part:

To those so confining their shipments for the entire 12 months ending December 31, 1912, a further rebate of 5 per cent on freights contributed up to June 30, 1912, and 5 per cent on those from that date to December 31, will be granted. To those who, on June 30, 1912, have so confined their shipments for the previous 18 months, an additional 5 per cent on freight contributed during the 6 months ending December 31, 1912, will be allowed.

Until further notice, shipments made by the Peninsular and Oriental, Ocean Steamship Co. (Ltd), Messageries Maritimes, North German Lloyd, Austrian Lloyd, Società Nazionale di Servizi Marittimi, Compañia Transatlántica of Barcelona and Cadiz, Glen Line (McGregor, Gow, & Co., Ltd.), Ben, Mutual, Hamburg-American Lines, and by the German Australian, Rotterdam Lloyd, Stoomvaart Maatschappij Nederland, East Asiatic Co. of Copenhagen, Russian East Asiatic Steamship Co. of St. Petersburg, Russian Steam Navigation & Trading Co.,


- ELEVATION -
- SHADE DECK -
- AWNING DECK -



Compagnie Française de Navigation de Chargeurs Réunis steamers to their Continental ports of call, or ports adjacent thereto, and by any conveyances to Baltic and Black Sea ports, will not invalidate claims for the above.

No "returns" will be payable on freight contributed by rice, hemp, tobacco, or treasure. Exporters applying for the returns, which will be payable in London, must fill up and sign forms obtained from the agents.

Japanese Use of Panama Canal.—Mr. M. Shiraishi, a member of the board of directors of the Toyo Kisen Kaisha (Oriental Steamship Co.), is at present making a personal investigation of the Panama Canal route.

When the Panama Canal is opened, it is probable that one or more of the three large Japanese steamship companies (Nippon Yusen Kaisha, Toyo Kisen Kaisha, and Osaka Shosen Kaisha) will either extend their present America-Japan-Hongkong service or establish new lines to the Atlantic seaboard. No report or plan on the project has yet been made public, and inquiry at the offices of the above-named companies elicited the uniform reply that while they must do something to avail themselves of the use of the canal when it is completed, they are still investigating, and no definite plan has been or is being made.

Round-the-World Line—New Boats.—Officers of the Nippon Yusen Kaisha and of Osaka Shosen Kaisha have personally inspected the Canal Zone. Rumor had it that the former will establish a new round-the-world line, starting from Yokohama for New York, via Panama, thence to Yokohama by way of Europe and Suez. This is not confirmed by the officials. At present the company has 11 steamers, all over 6,000 tons gross (besides 1 chartered and 3 owned by the company, used as extra-cargo fleet) on the European line, and 6 steamers on the American line. In 1911 the company placed orders with shipbuilding yards in Japan for 2 steamers, both of 6,200 tons, for the American line, and 2 of 10,500 tons for the European line.

These new vessels will be built to meet all the requirements of the Japanese shipbuilding subsidy act and the navigation subsidy act. Even should the Japanese Government fail to make subsidy provision for whatever new line on which the company may place these vessels, they would draw subsidy under the navigation subsidy act. The company now owns 70 steamers, with an aggregate tonnage of 280,000 tons, and 7 chartered (Government and Red Cross Society) steamers aggregating 26,000 tons.

Possible Extension of Service to New Orleans.—Another rumor was to the effect that the Osaka Shosen Kaisha, now having a trans-Pacific fleet of six 6,000-ton steamers, being cargo boats with little or no first-class passenger accommodations, contemplates the extension of its Hongkong-Japan-Tacoma line to New Orleans. This company purchased the *America Maru* (6,300 tons) from the Toyo Kaisen Kaisha, and it will probably build two or more steamers of a larger type.

Formosa.—Yo Sam Pa, one of the wealthy Chinese residents of Daitotei, has succeeded in organizing a small steamship company with $500,000 capital. He now owns the *Chozan Maru* and will add three large ships. The service will be bi-monthly from Tamsui to Foochow, Hongkong, Singapore, and Batavia.

The Russian Volunteer Fleet.—Has purchased 5 new steamers, and with this season start an improved steamship service between Vladivostok, Kamchatka, and Anadir. While navigation is open 9 steamers will be put on and 18 round trips will be made from Vladivostok.

New Ice Breakers for Vladivostok.—Consul John F. Jewell reports that in order to cope with the increasing commerce and importance of the port of Vladivostok it is stated that two new ice breakers have recenty been ordered by the Government, and that some will be built at the Russian works in the Baltic.

The Yokohama-Maru.—A new steel vessel for the Nippon Yusen Kaisha, was successfully launched at Nagasaki on January 30. It is a new type of freight carrier for this line and if to be placed on the Seattle-Hongkong run. It will also accommodate a limited number of passengers.

The vessel has twin screws, a shelter deck, and dimensions as follows: Length, over all, 415.6 feet; length between prependiculars, 400 feet; depth, 30 feet; gross tonnage is 6,200 tons. The engines are triple expansion, reciprocating, capable of developing 15 knots per hour. The vessel has been built to Government requirements, under supervision of Lloyds' surveyors, and will be classed as 100 A1 at Lloyds. It will receive subsidy from the Japanese Government under the following law:

Navigation subsidy shall be granted at the rate of not more than 50 sen (25 cents) per gross ton per 1,000 knots sailed for a ship with a maximum speed of 12 knots per hour, such rate to be increased by not more than 10 per cent for each additional knot per hour, according to the conditions of the route. Provided, that for every year over 5 years old a vessel is, a successive discount of 5 per cent shall be made. For calculating the subsidy the shortest distance between ports shall be taken, and less than 1 ton and less than 1 knot shall not be reckoned.

Amur Transportation.—The administration of the Amur Railway has decided to purchase and rent a number of river steamers belonging to the Chinese Eastern Railway for transporting railway freight. It is believed that upon the completion of the Amur Railway all the steamers of the Chinese Eastern Railway will be transferred to the former, and the latter will close its navigation department, retaining only sufficient steamers for military purposes.

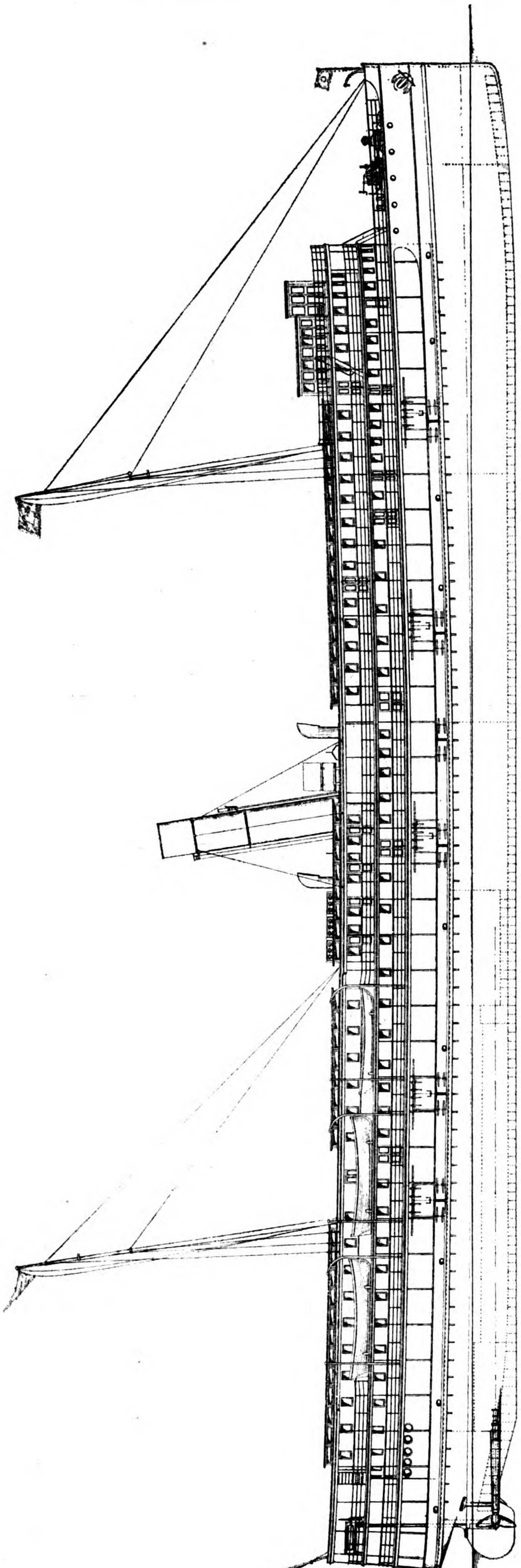
Harima Dockyard and Iron Works.—The new dockyard and iron works opened on January 21 (making the fourth private dockyard in the Kobe district, besides the Government yards at Kure) is at Oh, near the head of Oh Bay, on the Inland Sea, 47 miles west of Kobe by rail. It is owned by the Harima Dockyard and Iron Works Co., which intends to construct another dry dock to accommodate vessels of 2,000 tons in the near future. The following description is from a press account of the opening ceremony:

The dock, which is 434 feet long and 84 feet wide, has been cut out of solid rock. The entrance is closed by a floating caisson, made by the Osaka Iron Works. Two centrifugal pumps, discharging 5,000 tons of water an hour, can empty the dock in about three hours, while by opening four valves in the caisson the dock is filled in about an hour. The centrifugal pumps were made by a firm in Bedford, England, and are sunk underground in a large brick chamber level with the floor of the dock. The water is discharged into a short, granite-lined conduit that leads from the top of the pump room into the sea.

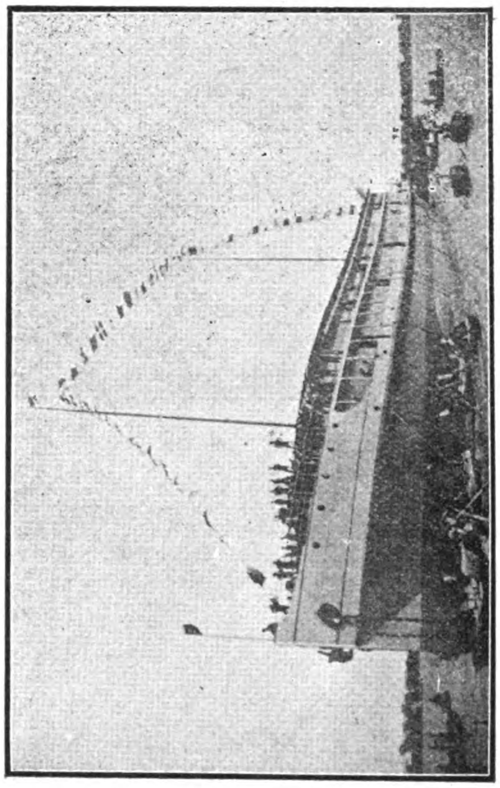
Along the dock are several hand capstans for use in warping ships; these capstans are to be later on controlled by electric power. The dock will accommodate vessels up to 6,000 tons, and near by are machine shops with lathes, drills, and cutting and planing machines. There is also a casting shop adjoining the fitters' department, but this is not quite completed.

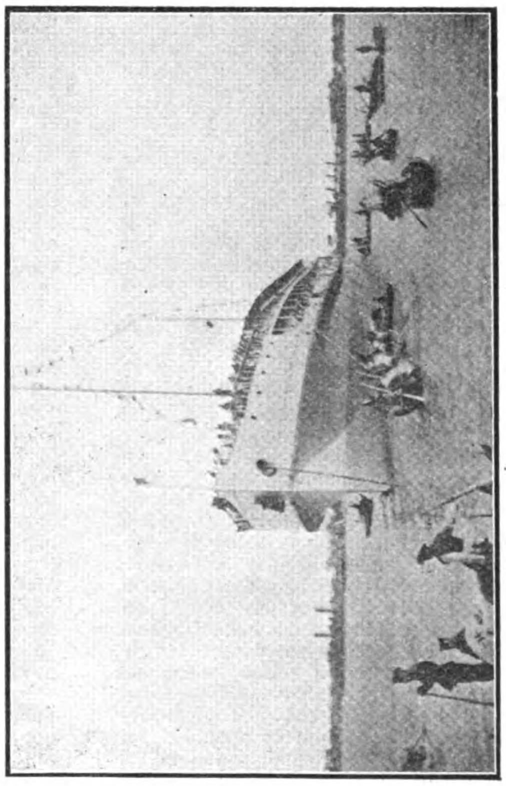
The Nanyo Kisen Kaisha.—Was recently promoted by the Mikami Steamship Company in Kobe with the purpose of establishing a shipping service from Japan to Manila, Saigon, Singapore and Java, the Japanese government assisting, and the prospects of the undertaking are hopeful.

The plan of the new company is to start operating in October, of the present year, with two, 3,000-ton steamers.

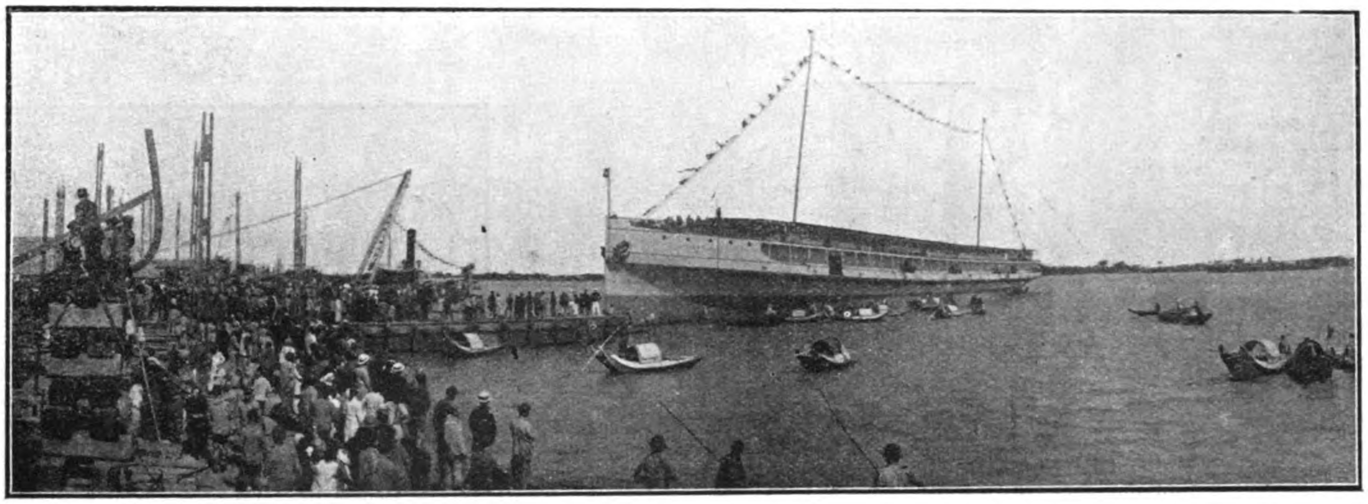


RIVER STEAMER "KIANG-WAH," BUILT BY THE KIANGNAN DOCK & ENGINEERING WORKS FOR THE CHINA MERCHANT'S STEAM NAVIGATION COMPANY





THE "KIANG-WAH" AFTER THE LAUNCH



THE STEAMER "KIANG-WAH" AFTER THE LAUNCHING

CHINA MUTUAL STEAM NAVIGATION CO.—The directors of the China Mutual Steam Navigation Company recommend a final dividend of 3 per cent. on the ordinary shares, making 6 per cent., together with a bonus of 24 per cent., a total distribution of 30 per cent. for the year. A dividend of 3 per cent., making 6 per cent. for the year, is proposed on the ordinary B shares.

THE C. M. S. KIANG-WAH

BUILT BY THE KIANGNAN DOCK AND ENGINEERING WORKS, SHANGHAI.—On may 2nd, the S.S. Kiang Wah, was launched from the yards of the Kiangnan Dock and Engineering Works at Shanghai. The steamer was designed and built for the Yangtze River service of the China Merchants' Steam Navigation Company. To the specifications of Capt. W. H. Lunt, the Marine Superintendent and Mr. G. Wallace, Engineer Superintendent of the Company. She has the distinction of being the largest vessel constructed in China.

With a tonnage of about 4,000 the Kiang-Wah has the following dimensions:—length over all, 340 ft.; length between perpendiculars, 330 ft.; breadth moulded, 47 ft.; breadth extreme over guards, 58 ft.; depth moulded to main deck, 1 4ft. 9 in.; moulded to main deck, 14 ft. 9 in.; 6 in.; height of upper to passenger deck, 7 ft. 6 in.; height of passenger to shade deck, 7 ft. 6 in.

There are two sets of triple expansion, surface condensing inverted direct acting engines, designed for a working pressure of 190 lb. per square inch. The condenser is one of Weir's "Uniflux" type. The air pumps are of Weir's "Dual" type and all other auxiliary engines, feed pumps, and feed heaters have been supplied by the firm of Messrs. G. and J. Weir.

The boilers are of Babcock & Wilcox marine water tube type, four in number, constructed under Lloyd's survey, for a working pressure of 190 lb. per square inch and designed with ample grate area for steaming with inferior coal.

The accommodation for first class European passengers is located forward below the uppermost deck in large and airy staterooms with a spacious and luxuriously fitted saloon adjoining. There are eight staterooms in all for the European passengers, each having two brass frame beds with wire woven spring mattresses, an upholstered settee, a patent folding lavatory and a wardrobe. The saloon is panelled in English oak. The dining accommodation of the saloon is arranged on the Continental style with small round tables and leather covered chairs. Electric fans are installed in the saloon and in all the European and Chinese storerooms as well as in the officers' and Engineers' rooms.

For the first class Chinese passengers, accommodation is provided on the deck below that set apart for the European saloon, and here there are staterooms for twenty-eight persons, all the rooms being arranged to open into a saloon, which is very spacious and furnished in Chinese style.

Second class passengers are berthed in a large deckhouse on the saloon deck aft with cabins, several of which are arranged to accommodate families; and a saloon extending the whole length of the house. There is also space for the second class passengers on the deck below, situated abaft of the first class Chinese accommodation, as well as the midship of the same deck where there are berths for 170 persons.

The third class accommodation is provided with beds for about 200 passengers, but there is a space for accommodating considerably more.

The wheelhouse, captain's and pilot's cabins are on the shade deck. The wheelhouse is for the type commonly seen on the American river steamers and is fitted, with all necessary appliances for navigating purposes including a controlling gear for steam steering engine.

FITTINGS AND MACHINERY.—The vessel is fitted with six life-boats of large capacity and a number of rafts with a total carrying capacity of over 250 persons, and is also equipped with numerous life-buoys as well as a life-belt for every passenger, with over 500 to spare.

She is lighted throughout by electricity, for which there are two generating sets, the smaller for the fans, and the larger for the lights as well as the fans. The first class European and Chinese saloons and staterooms and also the captain's, officers' and engineers' rooms are all heated by steam radiators.

THE FRENCH MAIL.—The French Parliament has renewed the contract with the Messageries Maritimes for postal services in the Mediterranean, Indian Ocean, Austrlia and the Far East, but several important alterations are made, notably in respect of speed, the tonnage of the ships, and the number of voyages, increase and augmentation being provided for in each case. The steamers on the Marseilles-Saigon-Yokohama run will have to do 15 knots instead of 14, and while the fortnightly service is maintained, a new monthly service, Marseilles-Saigon-Haiphong, to average 13½ knots, is to be created, to alternate with the service of the Chargeurs Réunis, thus giving Indo-China a weekly service with the metropolis. The second of the new mail steamers now in course of construction for the Far East service of the Messageries Maritimes Co. will be named the Andre Lebon, the name of the president of the Company. The Andre Lebon will enter the line in 1943 and will be a sister ship to the s.s. Paul Lecat, being of 16,820 tons, with a length of 555 feet; horse-power 11,000, passenger accommodation 750. The s.s. Paul Lecat will leave Marseilles for her first China trip on September 22.

Three new steamers have been added to the Lancashire Shipping Co.'s fleet plying between New York and Hongkong by way of Manila. The vessels have freight capacity of 8,00 and 10,000 tons, limited passenger accommodations, and a speed of 12½ knots.

A STRONG STEAM TUGBOAT.—Of the icebreaker salvage type, fitted with fire pumps, is provided for the Vladivostok commercial port by an appropriation of $30,000 from the St. Petersburg Government.

SOUTH PHILIPPINES S. S. CO.—Articles of incorporation have been granted to the South Philippines Steamship Company, a newly organized passenger and freight transportation concern launched in Zamboanga, Mindanoo, to engage in the coast-wise trade. The company has a capitalization of £500,000, of which £150,000 has been subscribed and paid up. Subscription of the capital stock to date is divided as follows:—H. C. Pfort £100,000, P. J. Moore, £25,000, J. H. Fincke, £25,000, J. A. Hackett; £1,000, and R. M. Denison, At a meeting of the stock-holders of the company, held recently, by-laws were adopted delegating the management of the corporation to a board of directors of five members to serve for terms of one year. The officers elected were Mr. Pfort, president, Mr. Moore, vice-president secretary, and Mr. Fincke, treasurer.

HAMBURG-AMERIKA LINE.—The report of the Hamburg-Amerika Line for 1911 shows that the net profit was m.43,799,044. Deducting interest on the prior loans, there remains m.40,520,185. Of this sum m.1,348,108 has been assigned, in accordance with the statute of the company, to the insurance reserve fund, and a sum of m.27,676.412 has been employed in writing down the value of ships, etc., and adding to renewal funds and other accounts, making together m.29.024.520. The available balance is m.11,495,665, which admits of a dividend of 9 per cent., leaving a sum of m.245,665 over. Most departments of the company's freight business showed a highly satisfactory development, but the emigration to the United States suffered an appreciable reduction, as compared with 1910. Regarding the Far East the report says that the plague in the north of China had interfered with the export of soya beans, but in general the consequences of the plague were not so severe as was expected. The revolution had brought complete uncertainty into all commercial circles.

NEW VESSELS FOR THE P. & O.—Of the four intermediate steamers of the *Nile* class now building at Greenock for the Peninsular and Oriental Steam Navigation Company the two latest to be laid down will be called *Nagoya* and *Nellore* respectively; the two earlier ships,

which are approaching completion, are, as stated in the company's last report, to be named *Nankin* and *Novara*. These additional vessels will bring the *Nile* class to a total of eight ships, each of 7,000 tons, and will be chiefly employed in the company's direct intermediate services between London, Calcutta, the Straits Settlements, China, and Japan, by which pessengers are conveyed without transhipment and at lower fares than those ordinary ruling.

The Osaka Shosen Kaisha will shortly open the regular steamship service between Takao, (Formosa), and Tientsin, with the steamers Bujun Maru and Choshun Maru of gross tonnage 1850; speed 12 miles an hour respectively. The Co. will maintain the regular service of twice a month, calling at Keelung, Foochow and Shanghai both ways and Dairen on the homeward trip.

1,000 Foot Dock for Pearl Harbor—The bureau of yards and docks of the W.S. Navy department has prepared plans for the increase in the length of the drydock which is under construction at the naval station at Pearl Harbor. The design of the dock as originally adopted called for a length of 800 feet, and it is proposed to add 200 feet. A dock of 1,000 feet at Pearl Harbor will require an additional expenditure of $650,000. This 1,000-foot dock in the Pacific is in accordance with the recommendation of the secretary of the navy contained in his annual report for two such docks—for the vessels in the Pacific and the other somewhere on the Atlantic coast.

New Motor Boat Co:—The Singapore Marine Motor Service has been formed to establish a service of modern motor launches for the use of the general public, passengers and the nautical community within the harbour limits of Singapore and the neighbouring islands. Estimates have been prepared showing a nett profit of $1,810 per month or 28 per cent per annum on the total capital. The capital is $75,000, of which $60,000 has now been subscribed. The shares are $10 each, payable $3 on application and $3 on allotment, and the balance as required. Six motor launches will soon be running in the harbour to various points and amongst the shipping.

The launches are 36½ by 8¼ by 3½ moulded depth, and draw loaded main draft, 18 inches. They are fitted with the Kelvin motors which develop 14-16 h.p. and the boats attain a speed of 6½ knots. The two large ones have 30-40 h.p. engines.

The Philippine Coast Guard Cutter Balabac has been sold to British North Borneo, the price agreed upon being P.80,000.

The Balabac is of the same size and general type as the Polillio and other better known craft of that class It has a gross tonnage of 460 and is well engined and equipped.

New Tank Steamers.—Will be built by the Standard Oil Company in Germany for placing in service between European and American ports and in the Oriental trade, according to advices received at San Francisco. One of them will be the largest carrier of the kind in the world, capable of handling 15,000 tons of the fluid. She will be operated by the Dentsche-Americanische Petroleum Gesellchaft, the German branch of the great oil trust, which now owns a fleet of twenty three steamers of upward of 84,000 gross tons. The vessel, according to, will have a length of 525ft., a breadth of 66¾ft., a depth of 41ft. and will have a loading capacity of about 15,000 tons. She will be driven by two 6-cylinder, 1,700-h.p. Krupp-Diesel engines which will give her an ocean speed of abont 10 miles an hour. Two-thirds of the length of the vessel will be occupied by the tanks, which will be divided by transverse bulkheads into 11 compartments, which, in their turn, are separated into 22 tanks, partitions being made by a longitudinal bulkhead extending over the whole length.

The Standard Oil Co. has now under construction on the East Coast two modern tankers, which will be sent to the Pacific as soon as completed. One, building at the New York Shipbuilding Co.'s yards is 380 ft. long and has a capacity of 30,000 barrels. The tanker which will be turned out by the Fore River yards is 435 ft. long and will have a capacity of 60,000 barrels.

Messrs. Pujalte and Company have purchased a new launch at Hongkong for the Philippine inter-island service. The new launch is 90 feet long, 15 feet wide and 8 feet deep, and was but recently completed at Hongkong. Some alterations are being made and cabins are being built for the crew. It is expected that these will be completed in time for the steamer to reach Manila about April 6th.

The launch is to be named the Sabatan.

Pacific Mail Freighters:—Washington, March 11, 1912.—"We are ready to build four monster freighters costing four million dollars each for the New York Manila service upon completion of the Panama canal, if the government will let us," said said Vice-president Schwarin of the Pacific Mail steamship company. The government, however, seems to be bent upon putting obstacles in our way."

There is a reported movement in Boston to form a new steamship line from that port to the East Indies and the Philippines.

Kiangnan Dockyard:—At the time of the outbreak of hostilities four war vessels ordered by the Manchu Government were under construction, two cruisers 275 ft. long and a couple of gun-boats being on the stocks. With the downfall of the Government, work on these vessels was stopped.

Other vessels under construction include a new river boat for the China Merchants, which will be the largest vessel of their fleet, its dimension being length 330 ft., breadth 47 ft., and depth 14 ft. 9 in. The vessel is rapidly nearing completion.

Work is also proceeding on a number of smaller craft, amongst them being five light ships ordered by the Customs for the Yangtze, launches for various firms, and cargo lighters. Two of the launches are ready for transport to Russia, where they will work on the Amur river.

The Mitsu Bishi Dockyard and Engine Works, Nagasaki, have purchased the sole patent rights, for Japan, of the air pumps manufactured by Messrs. J. Weir and Co., of Glasgow. Workmen have been sent to Glasgow from the Dockyard to learn the method of manufacture.

The *Shidzuoka Maru* was launched at the Kawasaki Dockyard, Kobe, on the 2nd inst. She is a steamer of 6,200 tons. building for the Nippon Yusen Kaisha, and is a sister-ship to the *Yokohama Maru* which is being completed for sea at Nagasaki.

Motor Boats for Chinese Waterways.—Two motor boats arrived in Swatow at the end of January for measurement and certification under inland water regulations by the Chinese customs authorities, being certified to carry 90 passengers each. These boats will ply as passenger launches between the cities of Chaoyang and Kueisu. A part of the 30-mile journey is through the Bay of Haimun, just south of this port, but the most of it is up a small river on the banks of which stands Kueisu. Chaoyang is already connected with this port by a steam-launch service.

These launches have a length of 63 feet, beam 14 feet, draft 18 inches, depth of hull about 4 feet. The hull is completely covered by a superstructure about 4 feet high, with the exception of a short deck forward, where there is a hand winch for handing the anchor. Being designed solely for passenger traffic, there are no cargo hatches. The long cabin formed by the superstructure and the hull is divided by transverse bulkheads into four main compartments, one for the engines and the other three for passengers, who enter the saloons by side doors, communication from one compartment to another being by a grating gangway carried alongside the vessel.

The Propelling Equipment.—The engine compartment amidships has no outside entrance, being entered from the after saloon through the chief engineer's cabin, which occupies some 10 by 3 feet on the port side of the engine room. On the starboard side is a similar cabin, but opening outside and not into the engine room. Thus the engines are effectively protected from rough weather.

The hull is of teak wood throughout. It is cut square at the stern and is cut away down the middle aft of the engine room to form a tunnel, in which the propeller works. A pair of rudders are fitted one on each side of the propeller tunnel. This form of hull is, I believe, in common use in the United States where launches are run in very shallow water.

The engines are Bolinder's (Stockholm, Sweden) patent 2-cylinder 50-horsepower direct reversible type, burning crude oil. They are capable of giving these craft a speed of something over 9 knots per hour. The exhaust is through a funnel, which also helps ventilate the engineroom. A compressed air whistle is provided.

These craft were built and the engines installed by Ulderup & Schluter, in Hongkong, at a cost of about $6,000 gold each, including $3,150 for engine.

The engines are said to consume 15 to 17 cents (gold) worth of oil per hour when when running at full speed, or, say, $1.58 per working day. For crew the monthly wages bill is about $56 each, the crew consisting of one chief engineer, at $13.50; one second engineer, at $11.25; and a crew of seven or eight deckhands, ticket collectors, etc., at $3.60 to $4.50 each.

Fitting and Decks.—The bridge is at the forward end of the superstructure, the entrance to it being through the forward saloon. To avoid undue height above the water line, it is not decked over. The forward deck, about 5 feet in length, is carried to a square end, to facilitate landing on the banks at way stations.

These boats, drawing only 18 inches, are adapted for very shallow waters. Their maximum height of abont 5½ feet above the water line enables them to clear easily the numerous bridges on the smaller rivers and canals in China.

Chinese being unaccustomed to the luxuries of travel demanded in the Occident, fittings are conspicuous by their absence. Each saloon has benches built along the sides and ends, and a table in the middle. Two toilets are located right aft.

Great Advantages of this Type.—As compared with steam launches, it would be possible to purchase for the price paid for these boats only a very small launch, with no greater passenger capacity, drawing at least 3 feet, and considerably more expensive to operate. The steam launches running to Chaoyang cost approximately the same as these motor boats and carry about the same number of passengers, but burn at least 1 ton of coal a day—fuel, $5.40—and carry a much larger and proportionately expensive crew.

Despite the fact that these boats were built for use in shallow waters, they came up from Hongkong under their own power, 185 miles of open sea, in very rough weather.

These are the first motor launches to be used commercially in this vicinity, and if successful, as there seems good reason to believe they should be, should prove the forerunners of many more. It is expected that motor launches for use on the Han River above Chaochowfu, will arrive from Hongkong shortly. (C. R.)

New Tugs Hankow.—The trial trip of the steel twin-screw steam tug Ping Fung, built by the Yangtze Engineering Works, Ltd., Hankow, and designed by Mr. Wong Kwong, M.I.N.A., M.I. Mech. E., etc., general Manager of the Works, for the Han-Yeh-Ping Iron and

NEW CHINESE CRUISER "FEI-HUNG"

BUILT BY THE NEW YORK SHIPBUILDING COMPANY, CAMDEN, N.J., U.S.A.

CAPTAIN YANG

Chinese Naval Commissioner, detailed to inspect the construction of the "Fei-Hung"

LAUNCH OF THE "FEI-HUNG"

Miss Chang, the Daughter of the Chinese Minister, Christening the New Cruiser

COMMANDER WANG

Chinese Naval Commissioner, inspecting the construction of the "Fei-Hung"

The Chinese cruiser Fei Hung, which is designed as a training ship for officers and men of the Chinese Navy, was launched at the yards of the New York Shipbuilding Company, at Camden, N. J. on May 4th.

The Chinese Minister, Chang Yin Tang, accompanied by Yung Kwai, First Secretary of the Legation, was present, together with a party of Washington officials and a delegation of Chinese students from the University of Pennsylvania.

Miss Chang Tuyi, the youngest daughter of Minister Chang, christened the Fei Hung.

The interests of the Chinese Government in the construction of the cruiser were looked after by Capt. C. C. Chen, Capt. O. S. Yang and Commander L. Y. Wong, who were stationed at the shipyards.

A protected cruiser, the Fei Hung is 320 feet between perpendiculars, 39 feet moulded breadth, 22 feet 6 inches moulded depth, 16 feet mean draft, displacement about 2,600 tons, with a speed of about 20 knots. Through the machinery space extends a double bottom, while the hull is divided into numerous compartments by watertight bulkheads and flats. Within the double bottom stowage is provided for feed water for the boilers.

Her Armament.—Her armament consists of two six-inch rapid fire guns located respectively on the forecastle and the poop decks; four four-inch rapid fire guns on the upper deck at sides, two just abaft the forecastle and two just forward of the poop; two three-inch rapid fire guns on each side of the upper deck amidships; six three-pounder guns three carried on each side of the upper deck; two one-pounder guns located on the after end of the forecastle deck, and two eighteen-inch revolving torpedo tube placed on the upper deck aft of amidships.

The vitals of the ship are protected by an armored deck of the arched type, fitted in the vicinity of the water-line and extending throughout the entire length of the vessel. Coal bunkers are so arranged along the sides of the vessel, both above and below the protective deck, as to give a miximum protection from gun fire.

Through armored tubes the ammunition for the large guns is taken to the firing point. An armored conning tower is built on the forecastle deck.

Accommodation is provided for 232 officers and men. The two masts are made suitable for taking a wireless telegraph installation with a range of 200 miles.

Under the protective deck forward and aft are placed the magazines, shell rooms, store rooms, fresh water, fuel oil, &c. Cold storage for the preserving of meats, vegetables and fish is placed above the protective deck amidships. Throughout the Fei Hung is lighted by electricity.

The machinery is of the most modern construction, embracing three propellers, with turbine engines of the Parsons turbine type, including bearings for forced oiling, lubrication pumps, oil coolers and tanks.

Two evaporators have a combined nominal copacity of 9,000 gallons of water for twenty-four hours for boilers and of 6,000 gallons of drinking water for 24 hours.

There are three boilers of the Thornycroft water-tube express type located in two fire-rooms. One is fitted for burning oil as well as coal. The total heating surface is about 14,500 square feet and the total grate surface about 271 square feet. Air is supplied to the fire by three blowers. The Fei Hung has two funnels.

Coal Co., Ltd., took place on 1[illegible]th inst. The vessel was completed last year just at the time of the revolution and had been seen by most people lying off the French Bund for a considerable length of time with the other tugboats of the Han-Yeh-Ping Company. She is 115 feet long + 21 feet beam + 9 feet deep, fitted with two sets of compound surface condensing engines, steam being supplied from one marine return-tube boiler. She has a towing capacity of 1,500 tons. The sister ship Ping Tai is also well advanced towards completion and will be ready for her trial trip in the course of the next few days.—"Central China Post."

TOYO KISEN KAISHA

APPROPRIATION OF PROFITS.

	Yen
Net Profits	386,725.280
Brought over from last account	7.636.406
Total	394,361.686
Reserve fund	2,000.000
Dividends for Shareholder	367,250.000
To be carried forward	7,111.695

The Directors were re-elected, and the meeting came to an end about 4 o'clock.

Norddeutscher Lloyd.—The report of the Norddeutscher Lloyd states that the total profits for the year 1911 amount to about m.41,500,000, as against m.38,100,000 for the preceding year, an increase of m 3,400,000. Although the North American passenger traffic showed losses of several million marks, the general state of freights to South America and Australia rendered the above result possible, and a dividend of 5 per cent. will be proposed to the shareholders at the general meeting on

April 3. The sum of m.20,700,000 (as against m.20,400,000 in 1910) has been applied to general expenses, this sum including m.1,500,000 for extra depreciation of sea-going vessels. The insurance fund has been increased by m.1,560,000, the reserve fund by m.4 0,000, the renewal fund by m.900,000, and the extra reserve fund by m.285,000, making a total sum of approximately m.3,000,000 (as against approximately m.2,000,000 in 1910) for the reserve funds. The company's financial position was considerably strengthened during the years, as the amount due to creditors decreased from m.36,400,000 at the beginning to m.19,500,000 at the end of the last current business year, against debts due to the company of m.18,100,000 at the end of the current year as compared with m.15,500,000 at the end of 1910. During the same period the amounts of prepaid passage money and current risks showed a surplus of m.2,000,000, being m.10,900,000 as against m.8,900,000 for the preceding year.

Proposals for Coal Boat:—HEADQUARTERS PHILIPPINES DIVISION, OFFICE OF CHIEF QUARTERMASTER, MANILA, P. I., MARCH 22, 1912.—Sealed proposals, in triplicate, for furnishing the Quartermaster Department U. S. Army, at Manila, with One Coal Boat will be received here until 11.00 a m. June 15th, 1912, and then publicly opened. Information and blank forms furnished upon application. I. W. Littell, Assistant Quartermaster General, U. S. Army, Chief Quartermaster.

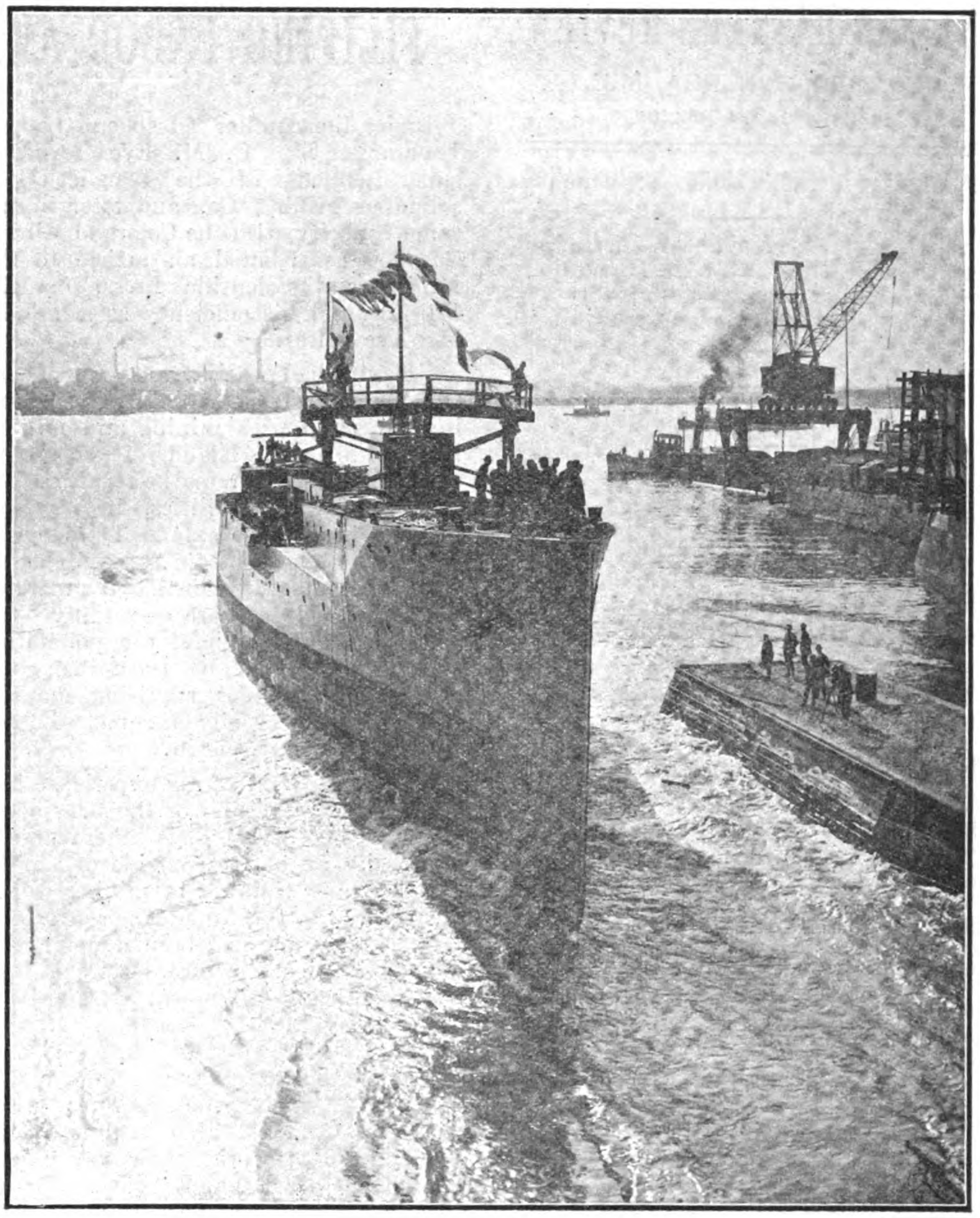
STEAMSHIP CONSTRUCTION, JAPAN.—The steamships in course of construction with subsidy promised under the Shipbuilding Encouragement Law now number ten, with aggregated tonnage of 49,500 as shown under:—

			Dockyard
N.Y.K.	...Yokohama Maru...	6,200	Mitsu Bishi
,,	...Katori Maru...	... 9,450	,,
,,	...Shidzuoka Maru ...	6,200	Kawasaki
,,	...Kashima Maru	...10,500	,,
,, ...	,,	... 3,500	,,
Railway Board...	,,	... 3,000	,,
,, ...	,,	... 3,000	,,
Kaiji K'kai...	Sakai Maru	... 3,500	,,
Home Office...	Noda Maru	... 1,250	Uraga
,, ...	,,	... 2,900	Kawasaki

The Noda Maru which is in course of building in the Uraga Dockyard is a dredger to be used for the improvement of the Shimonoseki Strait and the Katori Maru and Kashima Maru being built to the order of the Nippon Yusen Kai-sha are to be placed on the European route, while two liners ordered by the Railway Board are to be used for connecting the services across the Tsushima Strait. The Sakai Maru is an additional liner to the Volunteer fleet by the Marine Affairs Association.—Of these steamers the Yokohama Maru and Shidzuoka Maru will be launched shortly.

COMMISSION FOR YARROW CO. FROM U.S. NAVY DEPARTMENT.—The Navy Department at Washington, says Engineering, have paid Messrs. Yarrow and Co. a great compliment, having entered into a contract with them to design the shallow-draught gunboats which they intend to place on the China rivers. The vessels will be constructed in the United States This act on the part of the Navy Departmentant at Washington is owing to the exceptional success of his Majesty's shallow-draught gunboat Widgeon, which has made some remarkable runs on the Yangtze, The firm are building from their own design two similar boats—the Kingfisher and Rail—for the British Navy.

MOTOR HOUSEBOAT.—The Asiatic Petroleum Co. have placed with Messrs. W. S. Bailey & Co., of Hongkong, the order for a twin screw steel motor house-boat for service at Haiphong. The new vessel will be 60 feet overall, by 12 feet 6 inches beam, and is designed by the builders to attain a speed of ten miles an hour on a draft of 2 feet 6 inches. She will have an upper deck with wheel-house and canvas awning. The accommodation will consist of European cabins with beds, drawers, lockers, pantry and lavatories; crew's space and galleys aft. The motors will be a twin set of Kenvin Heavy Commercial Type, of 30 to 40 horse-power, to start on benzine and run on kerosine, low tension magneto ignition, gevernor and water-cooled silencer.



LAUNCH OF CHINESE CRUISER "FEI-HUNG"
At the Yards of the New York Shipbuilding Co., Camden, N.J.

NEW CHINESE GUN-BOAT.—The launch of the new Chinese gunboat "Yung Chiang" was carried out at the Kawasaki Dockyard, Kobe, on the afternoon of the 21st April. The "Yung Chiang" is the eleventh vessel of this type built at the Kawasaki yard, and is to be used mainly for river work. The work of construction was commenced in June 25th last. The dimensions of the new gunboat are: 218 feet in length; 29 feet breadth; 14 feet depth; 8 feet draught; displacement 780 tons; horse-power 1,400; speed 13½ knots.

"SHORE LEAVE" NEW YORK CITY

LEAVING NEW YORK CITY HOMEWARD BOUND

THE MOTOR LAUNCH, "HARPOON II"

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M.E.

PUBLISHER AND EDITOR

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A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and Advancement of Trade in the Philippines and Far Eastern Countries

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FILIPINO LABOR AND THE MINING INDUSTRY

Under the caption "Is cheap Labour Economical?" C. M. Eye formerly superintendent of the Benguet Consolidated Mining Co. and later in the same capacity with the Colorado Mining Co., has contributed an article to the Mining and Scientific Press, on the Filipino and his efficiency as a miner. Mr. Eye writes:—

"Having had nearly seven years of continuous experience with Filipino labour in connection with mining and milling in the Philippine Islands, I venture to offer the following remarks regarding its efficiency and possibilities, in response to the invitation extended in your editorial on cheap labour. I quite agree with Wickham Quinian that the mass of untrained Filipinos are essentially children, and that they have the possibility inherent in them of becoming good workmen. In lines requiring manual dexterity they rapidly become efficient under proper supervision.

"Practically all of my experience has been with the Filipino of the provinces. During the early days there were practically no natives outside of Manila that had any training in mining work, as, previous to the American occupation, very little mining had been done in the Islands. The use of powder in mining was practically unknown, except in a limited way in the Camarines. In the Benguet district the Igorotes had 'gophered' for many years. When the Americans came, the Igorotes were employed (and are still) in prospecting and assessment work, their pay being 50c. conant per day and 'chow.' When given contracts for assessment work they were paid from p.5 to p.7 per chipa (this being the span from finger-tip to finger-tip of a fair-sized native). I have had drifts in rock hard enough to stand up safely, but not requiring powder, driven for p.80 for the first 100 ft. When it came to regular operations, the Igorotes were found to be too undependab'e, however, and it became necessary to bring in Filipinos from the neighboring coast provinces of Pangasanan, La Union, and others. Some of these had had previous experience in powder and rock work on the Benguet road, and quickly became fairly good miners. They brought their families along, and settled down at the mines, and proved to be steady and reliable. When there was any scarcity in labour, these people sent for their friends and relatives, so the supp!y was kept up, and I can only say that after the first importation there were never any but temporary shortages in labour while I was in this district. The wages paid (p.1 per day with rations, or p.1.20 without) proved sufficiently attractive to bring the best class of labour from the lowlands to the mines.

"One mine in this district employed a few experienced Japanese miners to good advantage, using them mostly as timbermen and hard rock men, and paying them from p.2 to p.2.50 per day. Native timbermen were paid p.1.20 per day with 'chow,' and capitases p.1.40 to p.1.50. Since I left here two years ago, the rates have gone up about 20 c. conant all around, but are not high, considering that the men receiving them have become more experienced. The rates paid in the Camarines have, I believe, been somewhat higher than those given above, but the grade of the labour there was better to begin with. In the Aroroy district, Island of Masbate, the base rate for miners is a peso per day without chow; that of common labour being 80c. conant: timberman receive p.1.20 and capitases p.1.50 without chow. The efficiency of the labour there is not nearly so high as in Benguet, owing largely to the fact that it is recruited mostly from the Visayans of the surrounding country, and partly to difference in climatic conditions. The best men in that district have been brought in from Benguet and the Camarines. These imported men come to mine, and have no other interests to interfere. The local labourer works at the mines at times when crops have been planted and fishing is poor, or when he needs a little ready money.

"I have found, both in Benguet and Aroroy, that one of the best incentives to work for the native is to run a well stocked company store where he can get rid of his money and at the same time get something that adds to his comfort and welfare—in other words, to increase his wants by providing what he needs. When the native once gets a start he is very fond of good clothes, and will buy the best. It has often been remarked in Baguio that a man who has been at the mines very long can be picked out by the superiority of his dress. A tailor was employed in connection with the company store at one mine in the district.

"It is a very difficult matter to establish any exact ratio of efficiency between men of different races working under such different conditions as exist here and at home, but I shall nevertheless try to fix such approximate ratios as appear to me to exist, using that of an average miner in the West as 100%. On this basis, I would regard that of a native miner in Benguet, after having had six months experience, at 33⅓% and that of a miner of similar exper'ence at Aroroy at 25%. In timber work, their percentages would drop somewhat, owing to lack of previous training of the natives and their comparatively small stature (average height being about 5 ft. 4 in., weight about 130 lb.) The efficiency of a common labourer in Benguet I would put at 25% and in Aroroy at 20%. In all cases, it must be understood that the labour has proper and

capable supervision, and that no comparison is attempted between the native and the white working under the same conditions. The white man could not do the work of a native in this climate and stand up under it, so it is fortunate that it is not necessary.

"In milling work, where quickness and dexterity come more into play, I have found that native boys break in quickly, and in this work I would place the relative efficiency at 40% as compared with the average mill-hand without special training. For this work the smaller and younger men are the best, being more alert. It is necessary to avoid giving each boy too much to look after and to have good supervision to keep them up to the mark. Granting these, I would as soon operate with a good bunch of native boys as the average lot of millmen of equivalent experience at home. When it comes to lines requiring special mechanical training, it as yet necessary to draw on Manila. Good native machinists can be hired for provincial work at from p.75 to p.90 per month, and in efficiency the work of these men would be from 40 to 50% of that of white machinists. Engineers get from p.50 to p.60 per month, and firemen from p.35 to p.40, all without chow. The efficiency of the latter is about the same as with machinists.

"The general conclusion may be drawn with respect to labour in these Islands that the efficiency increases with proper training faster than the rate of wages. This makes the outlook, with a liberal supply of raw material to draw upon, very promising, provided that the people are not misled by agitators. I regard the policy of the present Government in providing liberally for the education of the native, especially in industrial lines a very wise one. It has been my experience that the boys who have been to school and speak English are quicker to learn and more ambitious than those fresh from the bosque. For timber construction and minetimber framing I have always employed Japanese carpenters, for the reason that they are very efficient and accurate. The Filipino is as yet lacking in skill in carpentering and smithing, but the schools are giving instruction along these lines, and the natives working with the Japanese as helpers are learning slowly, so it may be possible to eliminate the Japanese carpenter after a while, except for the finer work on construction.

"Altogether, the labour situation (upon which everything here depends) is not so bad as has been painted, and it will continue to improve, if those in charge of industries here will do the right thing and make the necessary effort to improve the quality of the work and look out for the personal welfare of their employees. Nowhere is scientific management more necessary."

HSIUNG HSI LING

With sixty thousand taels in the treasury at Peking, and thirty thousand at Nanking, the Republican Government assumed control of the destinies of the great Chinese nation. The Minister of Finance, Hsiung Hsi Ling accepted the difficult task of straightening out the tangled finances and providing funds to meet the urgent demands of the army and government. Confronted at the outset by a deadlock between the foreign bankers and the new government, arising from the signing of the Belgian Loan by the Premier on March 14th, five days after a firm option had been ceded to the International groups by the President, the task of the new Financial Minister was beset with great difficulty. From all parts of the republic telegraphic appeals and demands for funds poured in on the new Minister. The Commander-in-chief at Nanking, General Hwang Hsin, kept the wires hot with frantic appeals for cash to pay his troops or he would not be responsible for their behaviour. The Governors and generals of all provinces emphasized the urgency of immediate remittances for the troops or imperative administration expenses. The small sums collected from taxation were disbursed as soon as received. The internal loan from which great things were expected was a failure. Even at 8 per cent. for five years, the Chinese refused to subscribe any large amounts at par, and officials were hastened abroad to sell the bonds to the Chinese of the Philippines, Straits Settlements, Java and elsewhere at a discount. In Shanghai $35,000 of the bonds was sold at 75, and there is reason to believe that anyone who would subscribe to a block of over a million could secure the bonds as low as 66. The only course left open to the Minister of Finance, was to raise foreign loans, and here he faced the deadlock created by the Premier of his cabinet. With no other alternative he accepted the situation and resumed negotiations with the Foreign banks and paved the way to a more friendly feeling. It was only natural that a clash between the Premier and Finance Minister should follow, and that both would tender their resignations and it is also natural that the President would refuse to accept them. The Premier held his ground against the monopoly of the International groups, with their stipulations as to auditing or control as a condition to loaning any large sum, and vigorously defended his action in negotiating with the Belgians. The groups maintained their position in refusing to advance further funds until the Belgian Loan was cancelled, and their terms were accepted. Any solution of the problem carried with it, a blow to the Premier's prestige, and recognition of the foreign demands.

Each day the situation throughout the republic was growing worse, and heroic efforts were made to satisfy the demands of the unpaid soldiery. Provincial loans were raised in several instances, to tide over the crisis, and the spectacle was presented of a government pleading on the one hand for funds to disband the army and return the soldiers to their homes to prevent disorders, and on the other, the provincial authorities raising loans on local revenues, conditional in purchasing war material from the lenders to the full extent of the loan during the next five years.

It required a man of tact and judgment to break the deadlock, and relieve the situation.

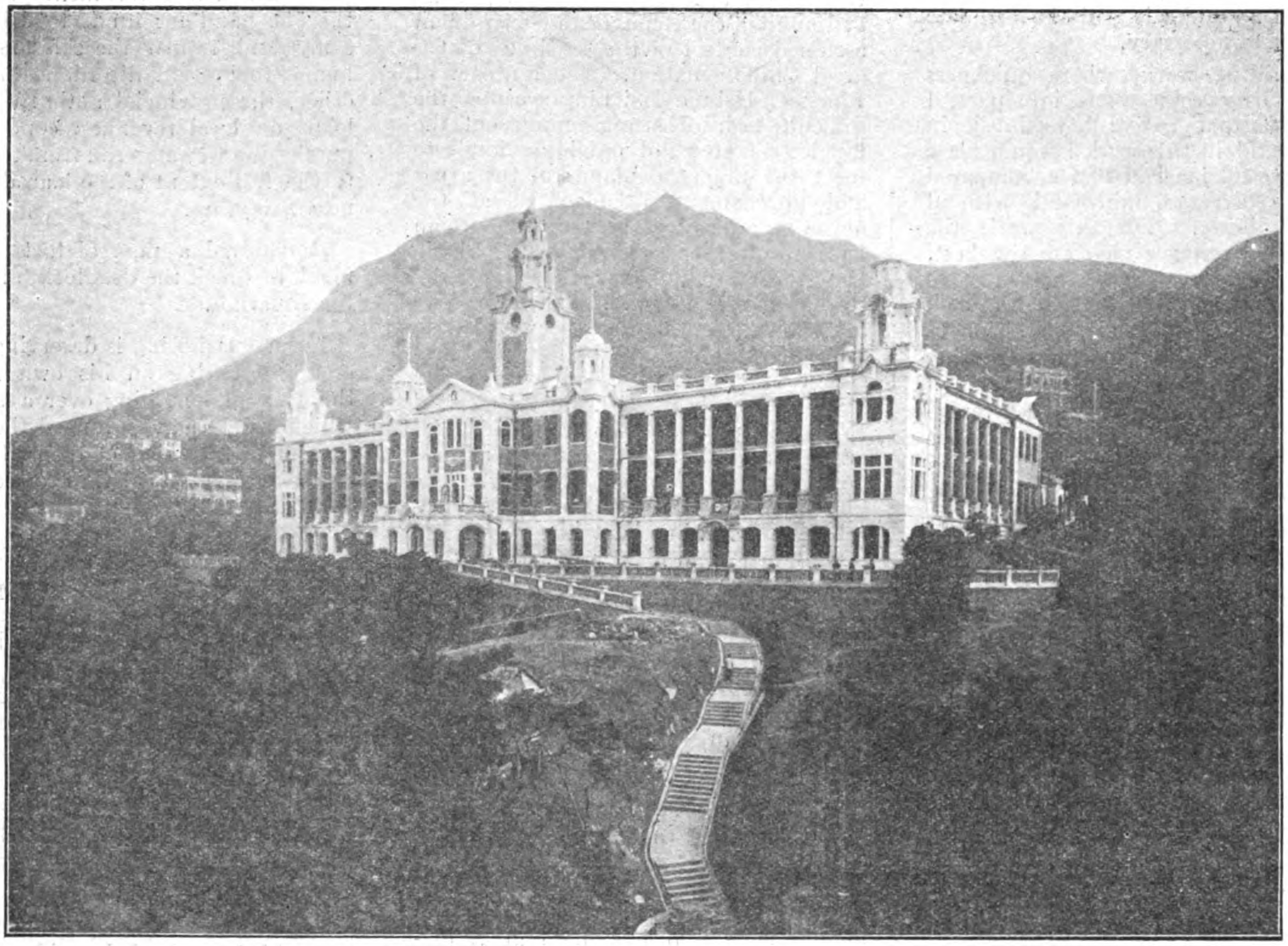
Hsiung Hsi Ling is deserving of great credit of taking on his own shoulders the task of smothing over a situation, which might have plunged the country into another period of turmoil and unrest, had the policy of the Premier carried through. Somebody had to cede, and Hsiung reopened negotiations with the International bankers, and was successful in securing several advance payments pending the acceptance of final terms. Had the Minister of Finance been permitted to administer his office without interference there is every reason to believe that satisfactory final terms would have been agreed upon, but no sooner was the advances of the foreign banks paid over, when a campaign against foreign loans was started throughout the republic.

Those who were most persistant in telegraphing demands for funds in order to avoid a revolt of the soldiery, turned around and telegraphed vehement messages charging the Finance Minister with selling the country to the foreigners.

His efforts were misunderstood and misjudged. His life was menaced and he was condemned as a traitor, and his fellow provincials threatened to disown him and destroy his ancestral tombs. Hsiung handed in his resignation again, and addressed an open letter to the country, in which he laid bare the inner secrets of the financial situation. A more gloomy document is hard to imagine.

The foreign financiers who were willing to treat with Hsiung maintained that supervision of the expenditure of any loan, must be a condition to advancing the funds, and that during the life of the loan, no other loans should be raised from other parties, and that the loan should not be employed for national defence or enterprisers in Manchuria or Mongolia. Negotiations have been dragging along from day to day, without reaching any conclusion, the Chinese holding out against any interference in the expenditure of the funds, and the groups as firmly insisting on this clause.

BUILDING NEWS



THE HONGKONG UNIVERSITY

Presented to the Colony of Hongkong by the late Sir Hormusjee Mody, Kt. Opened by His Excellency the Governor, Sir Frederick Lugard, G.C.M.G., C.B., D.S.O., on the 11th March, 1912

THE HONGKONG UNIVERSITY

Hongkong University, the institution founded and endowed by a number of British, Parsee, and Chinese gentlemen for the education of Chinese young men, and organized under the patronage and control of the government of Hongkong, was formally opened on March 11 by Sir Frederick Lugard, retiring governor of the colony, with elaborate ceremonies in which the Chinese residents of Hongkong took a prominent part.

The university starts with a complete building equipment and an endowment of $1,429.090 local currency. The building was constructed by the late Sir Hormusjee Mody, a Parsee merchant of Hongkong, as his contribution, at an expense of $180,000 local currency. The endowment includes subscriptions from Chinese sources, mostly from three Chinese residents of the Straits Settlements, amounting to $751,179; British and other subscriptions in the East, $144,650; British subscriptions in Great Britain, $466,564; and interest and other items, $66,706. The Faculty is substantially British in all lines but Chinese language and kindred subjects.

The assured income of the university from the beginning will be about $100,000 local currency, or something like $45,000 gold, per annum, including $14,000 local currency per annum appropriated by the legislative council of Hongkong as government support.

The buildings include the main edifice, a house for a married Principal, and houses for two married professors, or four bachelors. The main building is calculated to afford lecture rooms, etc., for the accommodation of 500 Under-graduates, and it is planned so as to be capable of extension. The chief feature is the Great hall, 80 feet by 50 feet with domed roof 43 feet high. There are 11 class rooms and 8 laboratories and workshops, with libraries, a common room for students and committee rooms, offices, coolies' quarters in basement, etc. It is built on perhaps the finest site available for the purpose in the Island in the neighbourhood of the Hospitals and Mortuary, whose proximity is a necessity for instructional purposes for medical students. It is located on the side of a hill and in addition to the large area required for the buildings it has been found possible at great cost by cutting and by retaining walls to provide a level playground 275.×275ft. The site has been given by the Colonial Government together with a large area immediately adjoining for Residential Quarters for Students and a smaller area for the erection of an Anatomical Laboratory. The whole comprises an area of 709,789 sq. ft. and is situated 200ft. above the sea, overlooking the City of Victoria, with a magnificent sea view over the Harbour. Immediately below it is the site upon which the Church Missionary Society are building a Hostel (separated only by a public road from the University grounds), and it is understood that on the adjoining site the Roman Catholic Mission will probably build their Hostel, while immediately above it and also conterminous with the University precincts is the area acquired by the London Missionary Society for a similar purpose. The cost of the buildings and preparation of the ground which has been borne by Sir H. Mody is approximately $176,-297. The value of the sites given by the Government is estimated at $176,297. The cost of the Anatomical Theatre is estimated at $28,450. This sum has been separately raised by the Chinese and Mr. Fisher has volunteered his services an architect. So far as the buildings are concerned there remain to be provided: (*a.*) Residential quarters for students; (*b.*) Fittings and furniture for the whole of the University buildings, and (*c.*) Equipment and Apparatus for the Laboratories and Workshops.

University endowment Fund.—In the statement giving the "Present Position, Constitution, Objects and Prospects" of the Hongkong University, the position of the Endowment Fund is summarised as under:—

Chinese subscriptions	$751,179
British and others—In the East	144,650
British—At home (£870 13.0)..........	9,421
Promised by John Swire & Sons and allied firms £40,000 @ 1/9...........	457,143
Interest, etc., $68,464 (less $2,250 expenses,*	66,706
Total $1,429,099	

* Includes salary of Registrar, and grant of $1,000 to College of Medicine and fee to draftsman of Ordinance, $500.

Of this sum $157,000 is hypothecated to Scholarships, the interest on which will accrue to the University (in lieu of the scholar's fees) whether a scholar has been nominated to the scholarship or not. From it must also be deducted the sums necessary for the Furnishing and Equipment, and the building of the students quarters, but when the quarters are occupied the rent will provide interest on the loan.

SIAM.—In view of the many public building projects in operation and contemplation, such as city waterworks, sewerage system, hospital and other buildings, and private building enterprises, there will be a growing demand for building materials of all kinds, in which bricks, tiles, and cement will be extensively used.

Up to the twelfth century laterite and sandstone blocks were used in the construction of the ancient temples and palaces of Siam, but following this period brick, mortar, and plaster formed the building material, which has also continued to be used for the more permanent buildings to the present time.

The brick and tile industry is in the hands of the Chinese and, as labor is comparatively cheap, very little machinery is employed in this industry. There is an abundance of good clay in the Me Nam River Valley suitable for the manufacture of bricks and tiles, and with proper machinery a profitable business may be established in this line.

The number of bricks imported for last year was 188,989, valued at $6,635, and the number of tiles, 1,085,430, valued at $35,257. The greater part of these were supplied by the United Kingdom.

BURMA.—The Public Works Department of the Government of Burma (Construction Department) is engaged in erecting a new building for the Government printing press in Rangoon.

The Rangoon city council has under consideration the erection of a new municipal building. Nothing definite will be decided until the budget for the fiscal year commencing June 1, 1912, comes up for decision in March. The present municipal building is not in good condition and inadequate for the various offices.

A new railway depot in Rangoon is now under construction by the Burma Railways. Freight sheds are also being erected and the yards are being extended. The depot is to be a two-story brick structure.

New office buildings, all steel-framed brick structures faced with cement, each three and four stories high, are being constructed in Rangoon by Sofaer & Co., Thos. Cook & Son, E. M. de Souza & Co., Robinson & Mundy, G. McKenzie & Co. The ground floor of the last-named is to be used as a garage and automobile salesroom.

SIBERIA.—It is reported that the Government has assigned $300,000 for erecting a separate building in Vladivostok for a boys' high school.

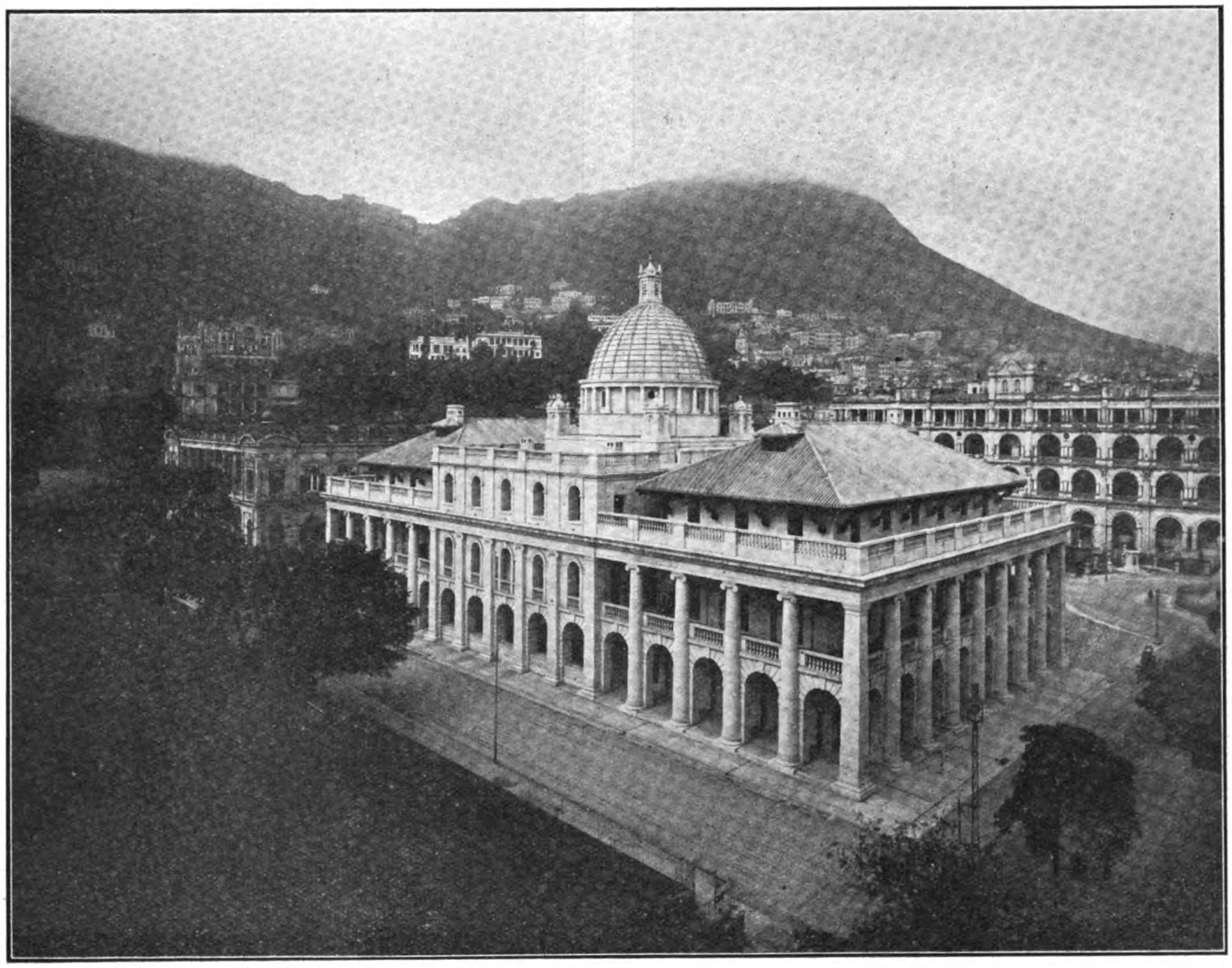
Khabarofsk, the capital of the Priamur districts, has experienced a steady and progressive growth in the past four years and last year enjoyed a healthy building extension.

TSINGTAU.—There is great activity in building operations at present in Tsingtau. About 50 buildings are under construction, new land is bought every day, and new plans filed. Under these promising conditions there is a good demand for building supplies and machinery.

PHILIPPINE UNIVERSITY BUILDINGS.—The Bureau of Insular Affairs at Washington furnishes the following note in regard to buildings for the University of the Philippines.

An appropriation of $125,000 gold for the construction of buildings for the University of the Philippines, which was made during the last session of the legislature, is now available. Plans are being prepared in the office of the consulting architect, William E. Parsons, and when completed and approved will be turned over to the Bureau of Public Works (at Manila). The bureau will then advertise for bids for the construction, and actual work will be commenced as soon as these are accepted.

The university now has permanent structures for the medical college, which is located on Calle Herran, the veterinary college at Pandacan, and the agricultural college at Los Banos. The new building, which will be used for administration purposes, will be located on the campus, near Calle Padre Faura. The present legislature will probably appropriate a sum which may be used for the construction of buildings to house the other colleges of the university, which are now located in temporary structures, most of which are rented by the Government.



THE HONGKONG LAW COURTS

FORMOSA.—With an appropriation of $75,000 the construction of a technical and industrial school in Formosa has begun in the prefecture of Taihoku at Dainan-sho. The school is intended for the natives (Chinese), and the course will cover three years; graduates will be employed in the railway and public works' departments.

SIBERIA.—*An agricultural school* is to be established at Nicolsk-Ussurisk. This school will be the first of its kind in the Russian Far East. The Ussuri Cossacks also desire to establish a simiiar school at Station Bikin. They are willing to subscribe a fund of 10,000 rubles ($5,150) for its establishment and to pay 1,200 rubles ($618) per 0annum toward its support, and also grant 50 dessiatines (1,350 acres) of land for the purpose.

CLARKE'S NEW FACTORY.—A new three-storey reinforced concrete factory building is being constructed by M. A. Clake at No. 12 Calle Misericordia, Manila, and is expected to be completed in June.

A shipment of machinery from the United States has been received which includes a complete ice and cold storage plant, machinery for a coco-cola bottling, seven-foot coffee roaster, a coffee granulating machine, candy machinery, elevator outfit, and other machinery and fixtures necessary for the manufacture and preparation of the products that will be turned out.

The ice and cold storage plant, will have a daily capacity, of fifteen tons. Water for the ice will be supplied from an artesian well 800 feet deep which has been bored on the promises and has a good flow of water. This water has been analyzed by an expert chemist who pronounces it to be well balanced in all essential minerals that go to make good, palatable drinking water. The ice and cold storage plant was manufactured by the Frick Ice Machine Company of Waynsboro, Pa., and the cold rooms designed by an expert of that establishment.

NEW CLUB HOUSE, CEBU.—The Cebu Club is preparing to erect a handsome club building containing social and recreative quarters for the members and equipment for all kinds of athletic games. Articles of incorporation have been taken out with the executive bureau for this purpose, the papers being signed to-day by Second Assistant Executive Secretary Manuel Yriarte.

Directors and incorporators of the reorganized club are as follows: Arlington Pond, F. B. Richards, H. B. Walker, A. J. Moore, J, W. Cairns, H. S. North, and W. A. Muir.

PROPOSED NEW DOCK AND WAREHOUSES.—The Standard Oil Company has renewed its application to the insular government for an allotment of space on the Malécon-Luneta fill and if it receives favorable consideration will erect a large pier and a storage plant. This project has been under consideration for several years and has been brought to the point of action by the recent destruction of the company's plant at Pandacan. It is necessary to erect another storage plant and if the government gives its sanction the combined pier and storage scheme will be carried out.

The plans of the company call for a large modern pier capable of accommodating the largest steamers that enter the port, the cost of which is estimated at P.800,000. The shore plant will provide for the concentration of all the business of the company in Manila, including, besides the storage department, administrative buildings, shops, etc. These structures will cost in the neighborhood of P.700,000, so that the joint investment will be about one and a half millions.

The entire storage plant will be constructed of reinforced concrete and made as completely fireproof and safe as modern construction permits.

Secretary Elliott has promised to pass upon the application within a fortnight and if a favorable judgment is given construction will begin at an early date.

NEW BUILDING FOR YOKOHAMA SPECIE BANK, SHAGHAI.—The Yokohama Specie Bank, which recently purchased land at the north corner of the Bund and Kiukiang Road, will erect a building on the property.

The newly acquired property is probably the most valuable in Shanghai. Though assessed at Tls. 100,000 per now, the Japanese bank paid Tls. 362,000 for the land, which comprises slightly more than one mow and a half. There is a two-story building on the property at present, which is in the center of a block of bank buildings.

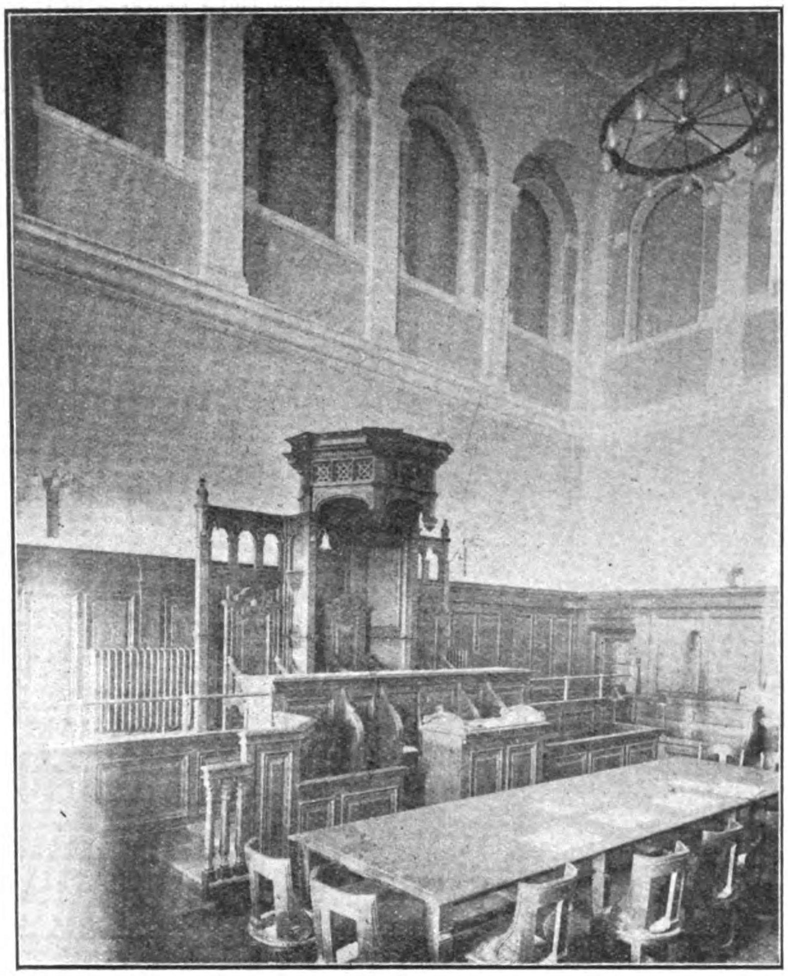
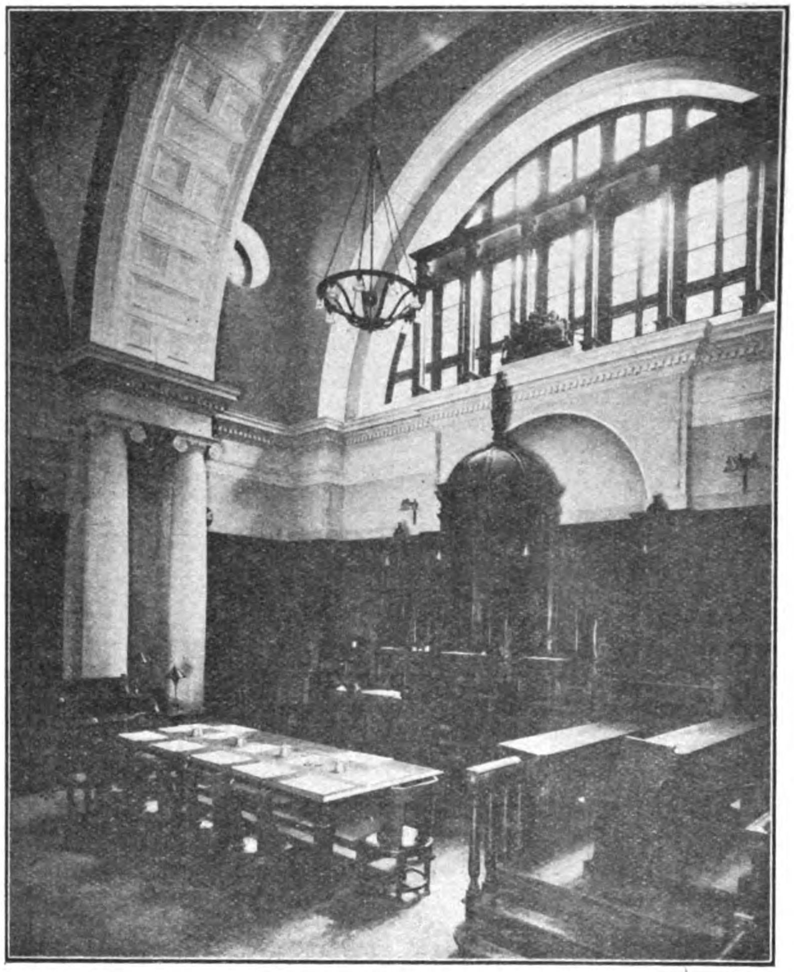
F.M.S. NEW BUILDINGS.—The Negri Sembilan Government has invited tenders for the construction of new Government offices for Seremban. The building which is to be erected will cost upwards of $75,000 gold.

The central fire station at Ipoh is estimated to cost $40,000 and the new post office to be erected there next year $60,000. It is also proposed to spend $145,000 next year on the construction of the new hospital for Ipoh.

A road from Tronoh to the Perak River, about 7 miles in length, will be constructed next year at a cost of $50,000.

MASONIC TEMPLE, MANILA.—A Masonic Temple will be erected on the Escolta on the site occupied by the old English hotel.

(*Continued on page 43*)

INTERIORS OF HONGKONG LAW COURTS

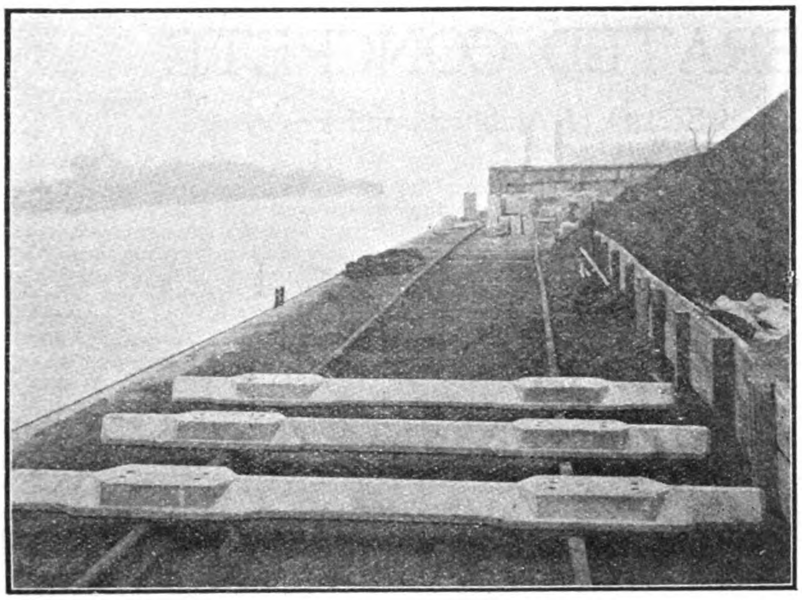


Fig. 1.—

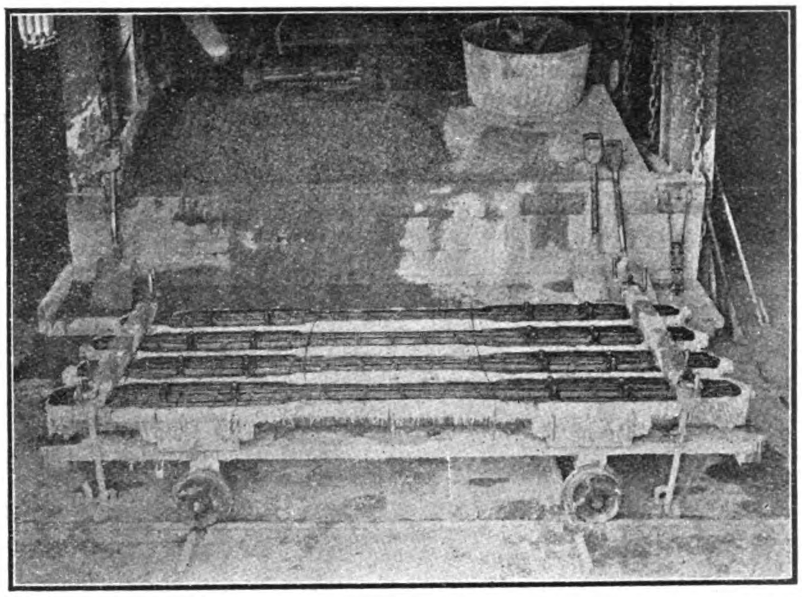


Fig. 2.—

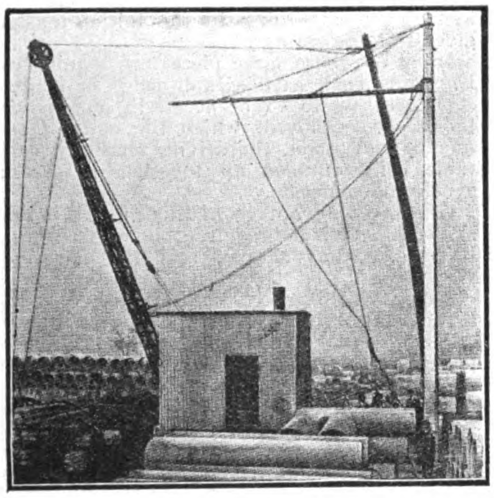


Fig. 8.—

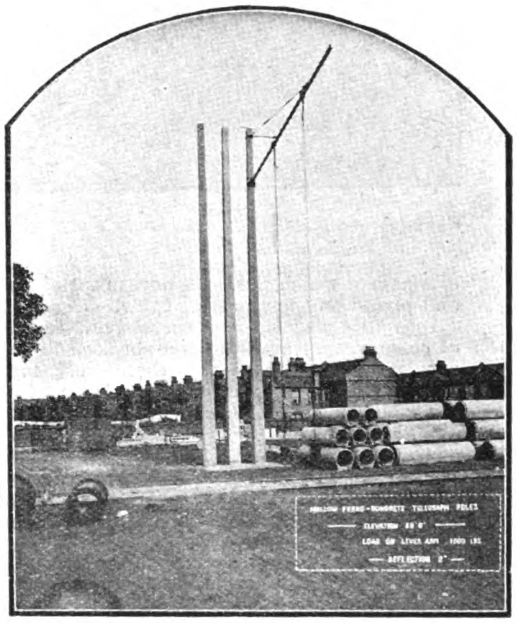


Fig. 6.—

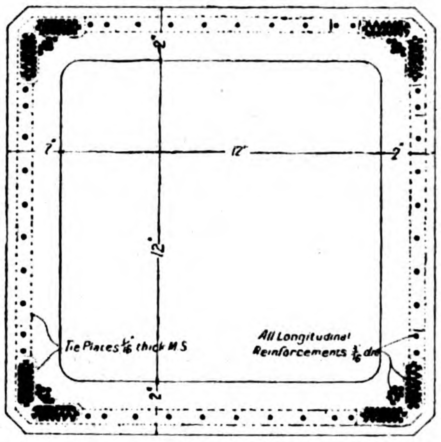


Fig. 7—SECTION OF BOTTOM OF POLE

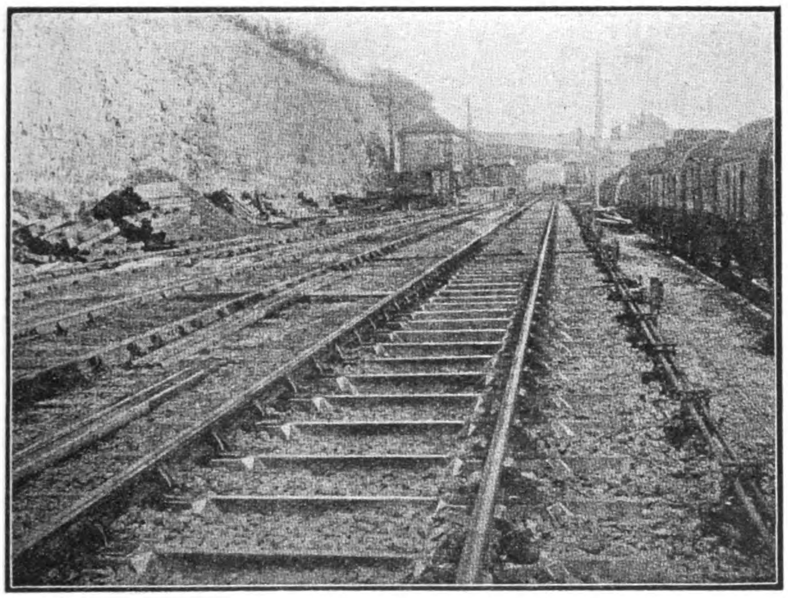


Fig. 4.—

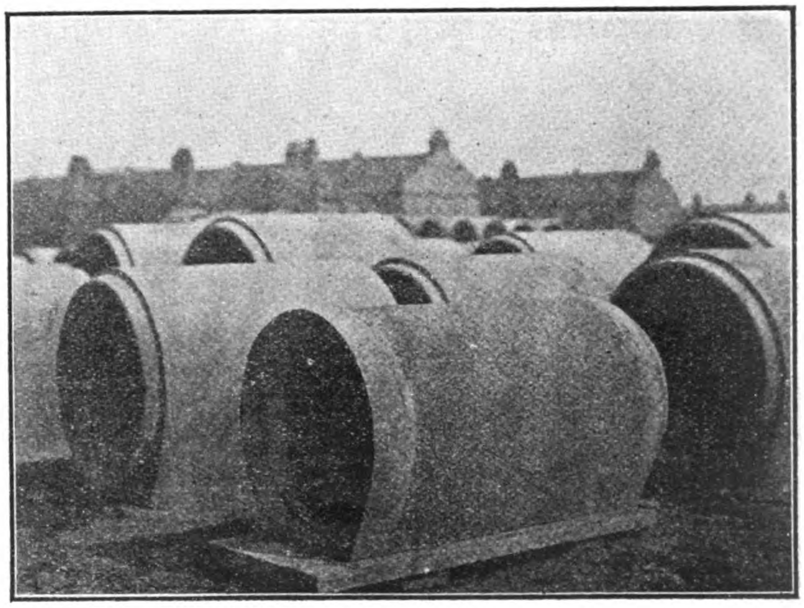


Fig. 9.—

OSCILLATED AND VIBRATED CONCRETE

Paper read by E. Bruce Ball, before the Shanghai Society of Architects and Engineers

Reinforced Concrete buildings and structures are now so universal that it is only natural that the method should be extended to the production of standard articles, and as I have had occasion recently to investigate this branch of manufacture, I think a description of the most scientific of the processes might not be without interest to the Members of this Institution.

There are several systems in vogue of making Concrete castings, but none to my mind are so advanced and obtained such remarkable results as the "Jagger" process.

The articles manufactured under this process are essentially machine made as distinguished from hand made castings.

A cast iron mould the exact form of the article to be produced is made, with provision for accurately locating the reinforcing wires or armature, and the Concrete mixture after being poured into this mould, has, through the medium of a special machine or table, imparted to it a rapidly oscillating and vibrating action.

The effect of the vibration causes the Concrete to flow uniformly into every part of the moulds, all ramming by hand or mechanical means being thus done away with.

These tables are subject to alternate vertical and horizontal oscillations, the amplitude of which is very slight but very rapid.

Under the action of these oscillations and vibrations combined with gravity the fine particles rapidly pass down between the coarser portions of the concrete completely filling up all spaces.

After a few minutes the Concrete becomes absolutely compact and as hard as stone, all excess water, scum, and excess cement rise to the top of the mould, and the result is that castings made under this system are entirely free from hair cracks, which is the most serious of all defects in ordinary ferro-concrete.

With this system armatures of the most complicated form can be employed, distributing the steel in the most scientific manner possible, and the soundest of castings result—in fact, castings made under this system, such as spigot sewage pipes and water works pressure pipes, are so perfect that when struck with a hammer in the most fragile parts they give out an elastic ring very similar to cast metal pipes.

The remarkable capacity of these machines for producing homogeneous castings was beautifully illustrated by a mould composed

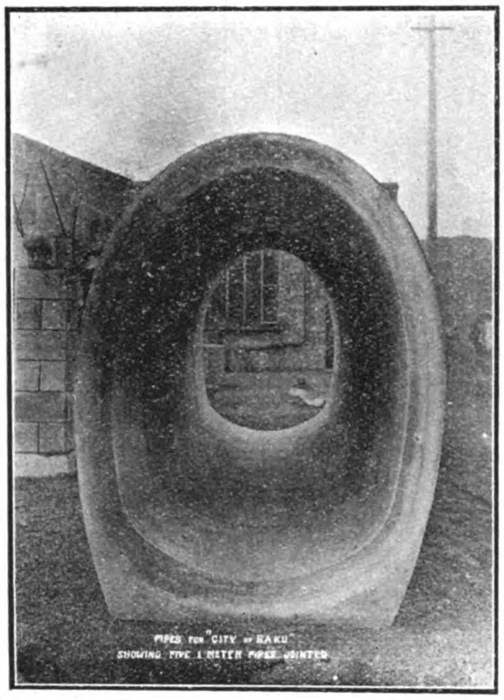


Fig. 15.—

of a case of which the sides were made of glass, and placed on the vibrating table.

Into this was thrown successive shovelfuls of cement, mortar and large broken flints of very irregular shape—thus there were layers of Concrete supported by these large pieces, the spaces between them being very considerable, and showing very clearly along the sides of the mould. The vibrating table was then set in motion, and it was seen that by degrees all the spaces were filled up with cement without any notable shifting of the large ballast, and after the space of a few moments all the cavities were filled up.

In the foregoing experiment it was further noticed that the cement gradually covered the glass side without any movement of the large ballast,—it having passed between the faces of the mould and the large stones.

After the casting was removed from the mould the surface was found to be covered with a smooth and perfectly adherent coating which gave a very satisfactory appearance showing that by this process it is possible to obtain (without coating or touching up) a fine finish on artificial stones, slabs, pipes, etc.

PLANT.—The special plant necessary for making concrete castings by this process consists essentially of vibrating tables and moulds, with the auxiliary plant consisting of lifts, means of transport of the material, mixing machines and lifting appliances for handling the moulds.

The vibrating table is essentially a rectangular metal frame, with provision for securing the various metal moulds, and connected to a base plate by links.

The machine itself is located below, but with the surface of the table level with, the ground floor, and rails are arranged on the table in continuation of the tramway track of the works, the oscillations and vibrations being transmitted through eccentrics and connecting rods arranged longitudinally under the table.

These connecting rods are joined to the table by springs, and the shocks are made more or less violent according to the initial tension given to these springs.

In cases where large pieces are required to be made, such as telegraph poles or similar structures up to 45 or 50 ft. in length two tables are employed, which the ends of the moulds rest upon, the driving shafts of each table being coupled up together to give a synchronous motion.

One great advantage of this process is that skilled labour is not required, the whole process being extremely simple, and the machines very robust.

This process has been tried and tested by the highest authorities and consulting engineers, and owing to the absolute standardization of pieces by this method there is undoubtedly a great field before it.

At this opportunity it will be impossible to go into great detail, and I propose to describe briefly some of the most interesting articles which are manufactured by this process, together with the special results obtained.

CONCRETE SLEEPERS.—The gradual depletion of forests without commensurate reafforestation, and the consequent rapid exhaustion of the available supply of timber, according to the

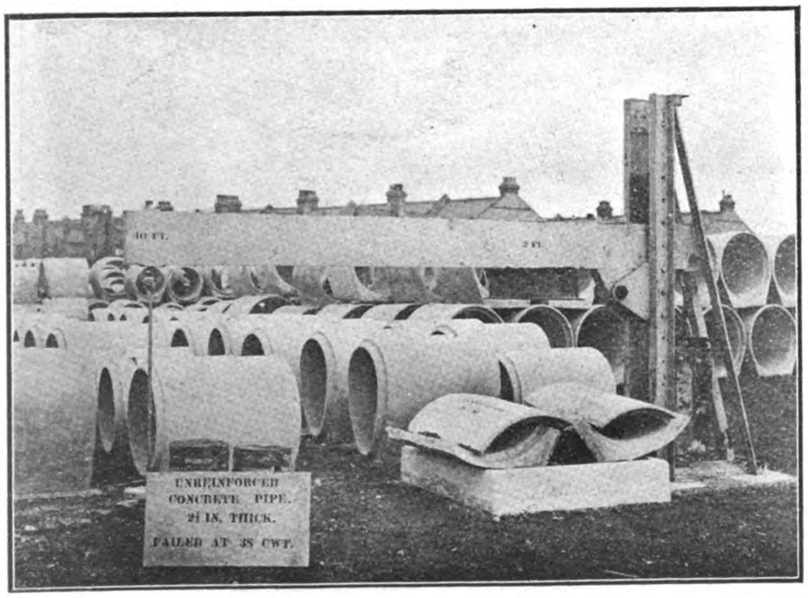


Fig. 10.—

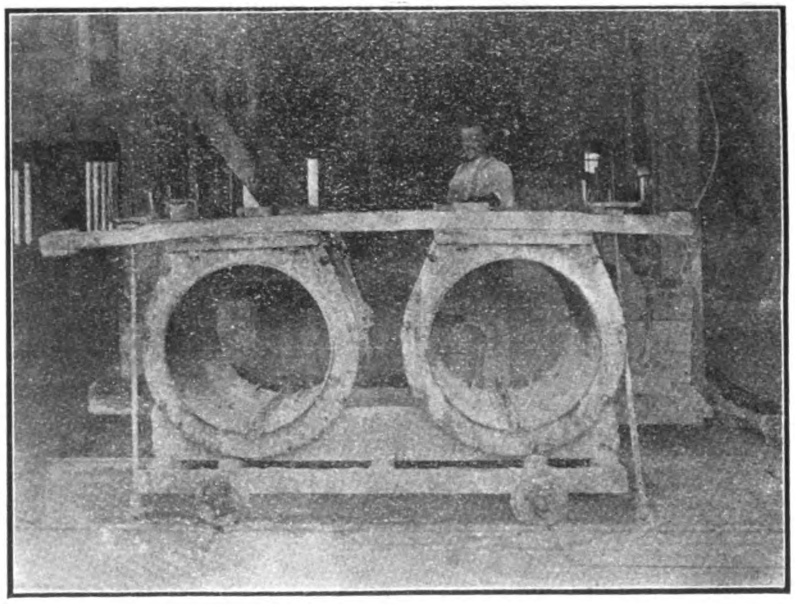


Fig. 11.—

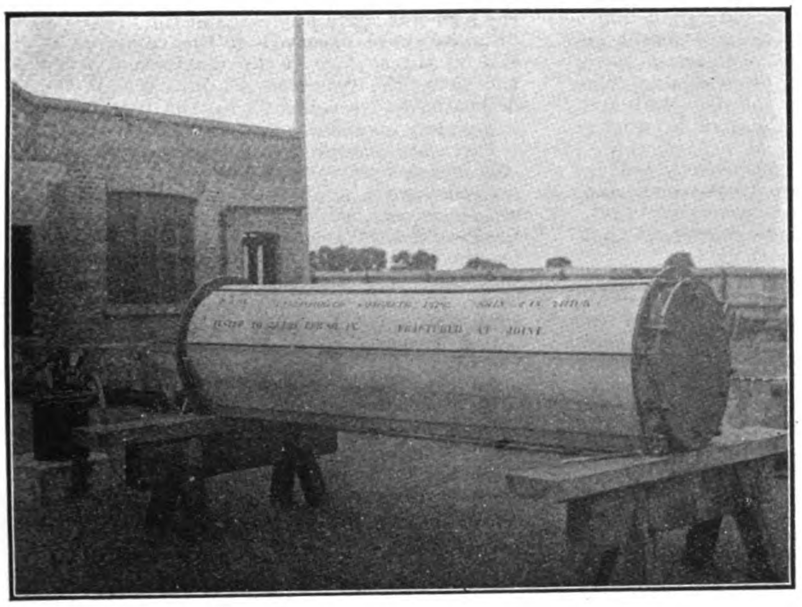


Fig. 12.—

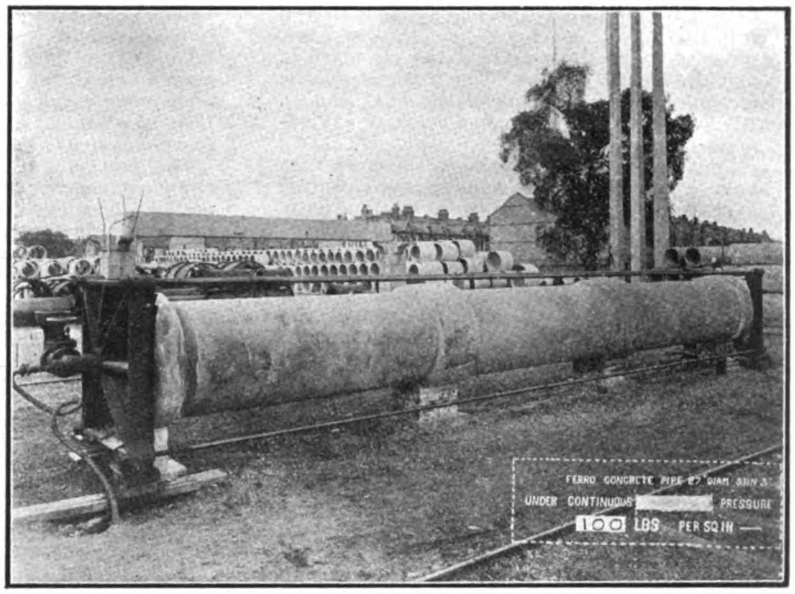


Fig. 13.—

"Journal of Forestry" at steadily increasing prices with deteriorating quality is bound to create an important problem which permanent way engineers of the immediate future must take into consideration.

It is needless to say that in anticipation of this, for some years steel sleepers of various designs have been used in various parts of the United States, Africa, and India, where wood is peculiarly subject to climatic influences, and the ravages of the white ant and the borer. Nor is it necessary to refer to the cost, merits or demerits of steel sleepers, they are already well known to engineers who have used them, and whose opinion on the matter we think should be most valuable. It is therefore particularly interesting to find that these are the very engineers who for years have endeavoured to find a satisfactory substitute, indeed, not for steel but for wooden sleepers. The deduction from this appears to us to be quite obvious. Hence the thought and industry devoted to the realisation of an ideal indestructible ferro-concrete sleeper, which, it is claimed, can now be for the first time manufactured and standardized by the "Jagger" process of oscillation and vibration, with its indisputable advantages.

Hitherto the factors operating against ferro-concrete sleepers have been excessive rigidity, bulk, liability to fracture by shock, hair cracks, cost, impracticability of standardization, and bad system of fastening.

These difficulties have now been overcome by using metal of small cross section, and packing the concrete in perfect sympathy with it by mechanical action, thus eliminating the human—the uncertain—element in the manufacture.

The quantity of steel used in the sleepers ordered by the Italian and British Railways is about 30 lb. and these sleepers are capable of carrying a distributed load of 5,000, and with a deflection of 1 in 1,500 tested as a free beam, and supported 60 in. between supports. They are designed to stand rough wear and severe handling.

The sleepers—Fig. 1.—made on this system have the advantage of being absolutely interchangeable at very low cost, with the holes for the dog-spikes spaced with the utmost precision, and conversely with wooden sleepers, they improve with age, being in fact everlasting and indestructible, possessing the great advantage of being impervious to the chemical action of the soil and the attacks of white ants, and other conditions which are so deletenous to the life of wooden sleepers, and in such countries as China, where wood is so expensive, and where attempts have been made to import teak and other hardwood sleepers, the ferro-concrete sleepers would show a very great saving indeed.

At first some objection was raised by railway engineers owing to the idea that the sleepers would be chipped and broken when the workmen are ballasting the line and tamping under the sleeper. Extensive experience however has proved this not to be the case, and further, the longer they are in service the stronger and harder they become.

Fig. 1. We have here actual examples of these sleepers by which you will see that they are arranged to take the ordinary dog-spikes for fixing the rails, or screw bolts and clips can be used; or further, the sleepers can be arranged to take a plate or the ordinary cast iron chair.

The manufacture of these sleepers is a most excellent example of interchangeable concrete work—cast iron moulds are provided, and provision is made for locating the armature or wire reinforcement in its correct position, and dowels or registering pegs provided for locating the exact position of the dog-spike holes so that in any quantity of sleepers made in this mould there is not a variation of $\frac{1}{16}$" between them.

Fig. 2. Shows the actual casting of these sleepers—the concrete is mixed in anupper story and run down an inclined chute direct into the moulds, and this can then be run straight on to the vibrating table, or as is found more advantageous, the chutes are fixed over the vibrating table, and immediately the mould has received the concrete the table is set in motion and in a few minutes the operation is completed.

Fig. 3. Shows the construction of the armature and the arrangement of the reinforcing.

In all these castings nothing larger than $\frac{3}{16}$" steel wire with an ultimate tensile stress from 35 to 38 tons per sq. in. is used.

Templates are made for each form of wire, and these are out to length and prepared in considerable quantities, and then assemblied by threading them through the distance pieces as thown in this drawing.

One detail of the reinforcement I would particularly call your attention to, and that is the meaus by which the bursting force due to the driving in of the dog-spikes is provided for. With this provision the sleepers are relieved of all stress when the dog-spikes are driven home.

This, you will observe from the drawing, consists of a spiral of $\frac{1}{16}$" steel wire, which encirles each hole.

The oak or hard wood tremain or bush of slightly larger diameter than the hole is first

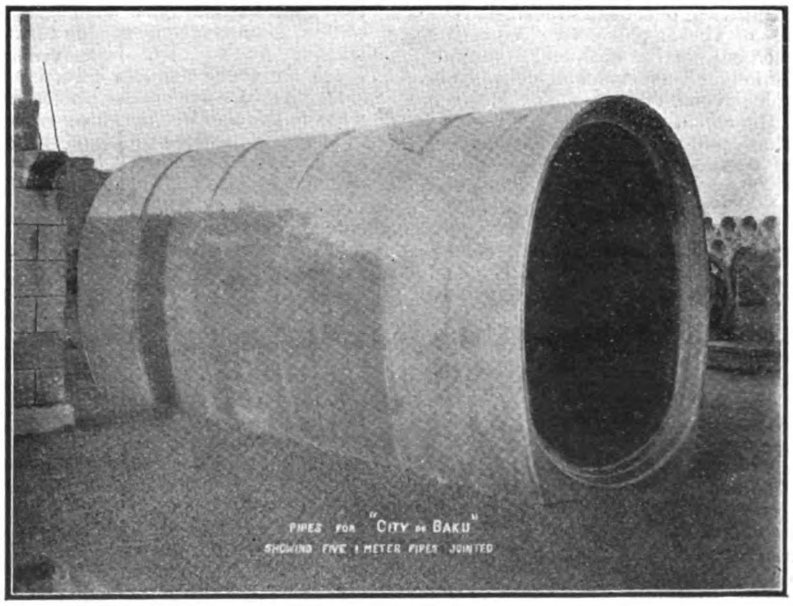


Fig. 14.—

driven in, and then the dog-spike is driven into this bush.

Fig. 4. This drawing is of the standard L. and N. W. Rly. type. The figures on the screen show the sleepers of the L. C. and D. Rly. over which an extensive series of expertment has been made.

Contrary to some criticisms, these sleepers have given much quieter and easier running.

There are four hundred trains running daily over this section of an average speed of forty-seven miles per hour.

At the time these sleepers were laid a new track was made side by side with wooden sleepers, to made a direct comparison of the two systems. In the case of the Concrete sleepers was found impossible to move the dog-spikes once they were driven in, and no "slacking" was reported—with the wooden sleepers however, after a certain period the dog-spikes required adjusting.

It is interesting to notes that, with a compressed oak bush for the dog-spikes a life of twenty years can be relied upon before these require renewing.

On the L. and N. W. Rly. these sleepers carry a 98 lb. rail, and an equivalent heavy axle load.

As an indication of the severity of this service I might mention that the old 10 × 5 wooden sleepers have proved useless under this load, and 12×6 are adopted in their place.

I am informed that these "Jagger" sleepers are now adopted as a standard by the Italian State Railways, where several hundred thousand are in use. They are also in use on the English Main Line Railways, France, Spain, and South Africa.

The weight of each sleeper is 300 lbs., and the cost compares favourable with hard wood. One machine has a capacity of 500 standard gauge sleepers per day of 10 hours.

Ferro Concrete Poles for Overhead Cables.—The use of poles of this system opens up a very large field indeed. For telegraph purposes in the remote districts and situations, such as Mongolia and Thibet they should prove indispensable as in these districts the inspection must be infrequent, and when the wooden poies commence to decay the danger of a break down of the service due to storms is greatly increased.

Fig. 5. Shows a standard 25 ft. pole made on the "Jagger" system. As you will notice, these poles are square in section and cast hollow. These poles are also made in lengths to 60 ft. and are particularly suitable for carrying electric light cables and also for supporting overhead wires on the tramway service.

Fig. 6. Shows three poles which were subject to extensive trials. The one under test is loaded in the same manner as the tramway poles, carrying two overhead lines. In the manufacture of these poles two vibrating tables are used supporting each end of mould, and an ingenious adjustable and collapsible core is employed which gives any desired thickness of the concrete walls.

Some of these poles were tested to destruction last year by the engineers of the General Post Office. These poles were 16 in. at the base and 8 in. at the top, uniform taper. The thickness of the concrete is 2 in. throughout. The poles were 44 ft. 6 in. long and for the purpose of the tests were fixed vertically and firmly embedded in concrete to a depth of 5 ft. 6 in.

The reinforcement consisted of 248 wires $\frac{1}{16}$ in. diameter. Fig. 7.

56 of the wires were assembled together in each corner and held in position by distance pieces spaced about 2 in. centres, but no binding wires were employed.

The tests consisted of exerting pulls of varying strength on the pole by means of a wire rope attached to the pole by a clip placed at a point 38 ft. 6 in. above the top of the concrete foundations. This rope was run over the pulley of a crane jib—Fig. 8.—arranged at a height approximately the same as the point of attachment of the rope to the pole and was then taken down to a Salters' balance of 3 tons capacity graduated in half-hundredweights, so that readings might be taken. The balance was connected to a geared winch by means of a chain. The tests were carried out on the 10th, 13th and 16th of October at the Company's works, Stevenage Road, Fulham.

The tests on October 10th consisted in applying varying loads up to 35½ cwt. and noting the deflection and permanent set, the load being released in each case, so that the latter might be measured.

The loads applied were :
3, 5, 10, 12½, 15, 17½, 20, 22½,
25, 27½, 30, and 35½ cwt.

Corresponding deflections were:
¾", 2", 4¼", 5"
6¼", 8", 9", 10½" 12", 14",
14¾", 19½".

Up to a load to 22½ cwt. no permanent set could be observed. A load of 25 cwt. produced a permanent set of ¼": of 27½ cwt., ½": of 30 cwt., ⅜": and of 35½ cwt., ¾".

It is pointed out that to the above weight should be added 1 cwt. for the weight of the spring balance and chain.

On the 13th October seven separate tests were applied to the pole. In the first five, progressive loads were put on the pole, deflections and permanent set being set out in the following table:

Test	Maximum pull in cwt.	Deflection in inches	Permanent set in inches.
1	31	16½	½
2	35	18¾	⅜
3	40	22	¾
4	45	25½	1⅛
5	50	29	1¾

In the sixth test the load was gradually increased to 57½ cwt. At this point, when the deflection was 34 in., the chain on the drum of the winch broke. The pole flew back, and after vibrating for a short time regained its vertical position, and it was found that no permanent set was shown.

In the seventh test the load was taken up gradually to 60 cwt. The deflection at this point is given as 37½" and the "permanent set" measured immediately after the release of the load was 2 in. After the expiration of an hour and a half, however, it was found that the deflection had become reduced to $\frac{11}{16}$ in.

A slight hair crack was observed on the tension side about 5 ft. 6 in. above the foundation when the load was 33½ cwt. When the load was 36 cwt. slight hair cracks appeared at regular intervals of about 6 in. to 9 in. apart. At 41 cwt. a slight shear crack appeared, starting at 33 in. above the foundation and extending vertically at a distance of 2 in. from the tension side for 3 ft. 6 in. in length. At 46 cwt. hair cracks occurred regularly every 3 in. or 4 in. on the tension side. At 51 cwt. cracks on the tension side were noticed to be travelling across the sides of the pole to within 6 in. of the compression surface. At 61 cwt. (60 cwt. plus the weight of balance, &c.), the shear crack was more pronounced, and hair cracks on the tension side occurred about 1 in. apart. No signs of failure were observed on the compression side at this load, and as this was the limit of the gauge on the testing apparatus, the test was discontinued. For this test a more powerful winch and a spring balance of greater capacity were employed than in the tests on the 10th inst. The weights above mentioned must be increased by 1 cwt. for the weight of the balance, &c.

On the 16th October, the pole was tested to destruction. There were two tests. In the first the load was increased, from 20 cwt., when the deflection was 9 in. to 92 cwt., when it was 66 in. The permanent set was found to be 21 in. at this point, and the cracks on the tension side and the shear cracks were more numerous and pronounced. No signs of failure on the compression side were however observed. In the second test the load was again applied, and the first signs of failure were observed on the compression side at the surface of the foundation, when the pole was deflected 73 in. When the deflection had reached 78 in. the pole failed completely on the compression side.

There are several systems for manufacture of concrete poles and doubtless you have noticed those in the French concession. These are, however, weight for weight of concrete, the weakest of the better known systems. On the "Jagger" system it is possible to give an infinitely superior article at the same time cheaper than by any other process containing equal quantities of material.

Not only is it possible to use larger aggregates but a much smaller quantity of cement is needed as the resulting casting is so perfectly homogeneous.

One important advantage in the "Jagger" poles is that they come out of the mould perfectly complete, with all the holes cast in for bolting the cross pieces and also for the climbing irons. Poles carrying lighter loads have a corresponding reduction in the percentage of steel required and small cost for the pole.

Pipes.—In this direction is probably the greatest field of all for interchangeable spigot and faucet pipes made by this process. We are all familiar with the usual hand made concrete sewer pipes and many examples of these can be seen with the spigots rubbed or dropped off, these being repaired by laying on each cement. The result is not altogether satisfactory as pipes made under these conditions are extremely porous and very fragile and far from being interchangeable. On the "Jagger" process these pipes are made with and without reinforcement and the density of the resultant casting is so great that it takes considerable force with a hammer to fracture the spigot; in fact, the elasticity is so great that the hammer rebounds, as off a steel casting.

The point which will appeal to all engineers is that pipes made under this process are absolutely interchangeable and the spigots fit perfectly into the faucet of the corresponding pipe.

Fig. 9. Will show you a group of pipes ready for shipment.

Fig. 10. Shows testing of unreinforced pipes to destruction, the concrete in the example shown being 2-1/4 inches thick, and the pipe failed under 38 cwt.

Fig. 11. Shows the moulds on the vibrating table ready to receive the concrete.

The further important field which is opened up is the possibility of the manufacture of concrete pipes for waterworks.

Fig. 12. Shows an unreinforced concrete pipe tested for 25 lbs. to the sq. in. with a skin 2 in. in thickness.

Concrete high Pressure Pipes.—These pipes are only 3 inches in thickness and have no lining or rendering of any sort and contain only four per cent of steel reinforcement and they stand an internal hydraulic pressure of 10 atmospheres, or say of 150 lbs. to the sq. in. without showing any signs of sweating whatever.

The next best pipe of the kind ever manufactured in the world was manufactured in the United States in the Government Laboratory and was 9 inches thick and contained four or five times as much reinforcement, and yet the internal pressure it would stand was only 40 lbs. to the sq. in.

Now, if you compare the 3 in. concrete pipe made by the "Jagger" process with the 9 in. concrete pipe made by hand, and with machine tamping, you will readily appreciate the enormous difference in favour of the "Jagger" process. In fact, the 3 in. "Jagger" pipe is about five or six times superior as compared with the 9 in. concrete pipes by other systems.

Fig. 13. Will show this pipe under actual tests and the pressure was kept on for many weeks, under a pressure of 100 lbs. per sq. in.

Subsequent pipes have been made for the above mentioned pressure of 150 lbs. per sq. in.

RAILWAYS

(Continued from page 12)

China across the track of South Manchuria Railway to the city of Mukden, the work thereon has sufficiently progressed to permit running freight and passenger trains to a temporary station erected about a quarter of a mile from the outer wall, and near the West Gate. The new station is to be known as Shenyang, while the old station of that name is to be given the name of Huangkutun. The traffic movement commenced on January 15.

Two Bean-oil Tank Cars.—Constructed at the railway workshops, Dalny, were subjected to a trial run with satisfactory results. Each car has 27 tons capacity and is partitioned into four chambers for transporting oil in small consignments.

JAPAN

San in Branch.—The railway line between Hamasaka and Kasumi, in Tajima province, a distance of about eleven miles, and reputed to be the hardest engineering work on the San-in western branch line, was opened to general traffic in March. By the completion of this section, the San-in districts have been brought into closer relations with the Kwansai regions. It means also practically, if not in fact, the opening of the trans-San-in railway, which is projected to cover a total distance of about 230 miles from Kyoto, the starting point. The work was begun in 1900, and has cost up to the present about 30 million yen, from which fact alone it may be inferred what difficult piece of engineering work the line between Hamasaka and Kasumi has proved. The great bridge is 1,017 feet long, and 125 feet in height.

The Toyama-Naoyetsu Line now in course of construction is expected to be opened early in October.

New "Feeder" Railways.—The total mileage of the feeder lines to the main Government railways, which have been building since last year and are expected to be opened to the traffic in the course of the current year, will be nearly 40 miles.

Fig. 14. Shows the pipes laid in the city of Baku water works. This illustration shows five of the pipes, each one metre in length jointed. From this you will judge the beautiful regularity of each of the castings.

Fig. 15. Shows the internal view of the same five pipes joined together, and perhaps illustrates better the interchangeability of pipes made on this system.

I would remark that 110 miles of these concrete pipes were supplied for the Baku Water Works conduit, and established a record contract in concrete castings.

From the foregoing examples you will readily appreciate that no form is too difficult to be made by this process, and for building construction an endless variety of beams and special forms can be made, also paving blocks, fencing posts, artificial stone, and in fact anything where stone or concrete is used.

The following gentlemen joined in the discussion and contributed much valuable information:

A. C. Clear, Esq. Superintendent and Chief Engineer of Ways and Works Shanghai-Nanking Railway.

T. H. U. Aldridge, Esq. Electrical Engineer to the Shanghai Municipality.

Professor Robertson.

C. H. Godfrey, Esq. Engineer and Surveyor to the Shanghai Municipal Council.

E. Bluce Ball.

April 26th, 1912.

The Maoka line—from Shimodate station, on the Mito line to Maoka, Tochigi prefecture, a distance of 10 miles 31 chains, to be opened to business on April 1st.

The Kurayoshi line—from Kamii (now Kurayoshi on the San-in main line, to Kurayoshi-machi, Tottori prefecture, a distance of two miles 42 chains, to be completed in June this year.

The Kuroishi line—from Kawabe station on the O-U line to Kuroishi-machi, Aomori prefecture, a distance of 4 miles 13 chains to be opened in August this year.

The Iwauchi line—from Ozawa station, on the Hakodate main line, to Iwauchi-machi, Shiribeshi province, a distance of 9 miles 38 chains, to be opened in November this year.

The Wakibetsu line—a distance of 14 miles 13 chains between Nodzukeushi and Rubetsushibe, on the projected line from Nodzukeushi, on the Abashiri line, to Wakibetsu, in Kitami province.

Joso Light-railway Co.—Mr. T. Takeuchi and other Tokyo business men have organized a new joint stock railway company named the Joso Light-Railway Co., with a capital of 1,000,000 yen in 20,000 shares. The line of the company will be constructed between Toride, in Ibaraki prefecture, on the coast line of the North-Eastern State Line, and Shimodate, on the Mito line, the line running through the towns and villages of the old route known as the Mitsukaido, covering a length of 33 miles. The line was chartered in November last year and is to have subsidiary grant of 5 per cent. in accordance with the provisions of the Light-Railway Regulations. Of the total shares, 18,500 have been taken up by the promoters and leading Tokyo business men, including Baron Shibusawa, Messrs. C. Kikuchi, S. Hoshino, S. Kuno, and others. The remainder (1,500 shares) will be offered for public subscription.

I. J. R'ys.—Mr. S. Hirai, vice-president of the Imperial Government Railways of Japan has given the Japan Advertiser the approximate allotment of the 25 or 30 million yen appropriated for railroad improvements by the Government.

About 60 %, or from 15 to 18 millions is to be spent for way works.

Rolling stock will require between 7,400,000 and 7,800,000 yen or 26 per cent.

The Electric Equipment calls for an expenditure of between 2,750,000 to 3,300,000 yen or 11 per cent.

And 3 per cent. will be spent on steamers—or 750,000 to 900,000 yen.

Nagasaki Station.—In April, says the "Nagasaki Press," the long-delayed reconstruction of the Nagasaki railway station is to be begun. The new buildings will be two-storied and foreign style and the cost is estimated at Y150,000. The work will be completed some time in October.

The Mansei Bridge Railway Station.—The Mansei-bashi railway station in Tokyo has been completed, and handed over to the Central Superintendence Office of the Railway Bureau.

The construction of the station cost some two hundred and ninety thousand *yen*, required the work of sixty thousand men and officials, and took over two years to complete.

It was started in August, 1909, under the direction of Mr. Takegoro Okada, and was completed in September, 1911.

The building is two-storied and is constructed after the Renaissance style of architecture from designs by Dr. Tatsuno, beauty and strength constituting its main features. The ground floor consists of waiting rooms for different classes of passengers, cloak rooms, the station master's room, luggage and inquiry offices, and an open hall of one hundred and thirty *tsubo*. The floors of the various rooms are asphalted, whilst the waiting rooms are all provided with marble fire-places. The walls are painted white, and the chairs the same colour as that of the tickets according to the different classes, so that a glance may enable the travellers to distinguish the different classes of waiting-rooms. The upper story is appropriated for a business room and restaurants, Japanese and foreign, consisting of three serving rooms and one bar room.

The dimension of the ground is 451 *tsubo*, measuring 45 *ken* in length, and 15 *ken* in breadth. The principal construction materials are two million bricks, three thousand three hundred poles and pillars, twenty thousand blocks of quartz, one hundred and eighty tons of steel sheets and plates, and three thousand five hundred *kwamme* of copper plates. The building is perfectly fireproof, every room being separated by reinforced concrete, whilst the roof is covered with copper plates set in iron frames.

CHOSEN

The Kang-gyong-Kunsan section of the Konan railway of Chosen has been open to traffic since March, the distance being thirty-two miles. This completes the Korean branch of the Seoul-Fusan railway, which branches off at Tai lyon and runs to Kunsan, a distance of 69 miles.

FORMOSA

Formosa Private Railway.—T. Ando & Co., of Takao, south Formosa, have made application to the Formosan Government for a franchise to construct a private railway in the Prefecture of Ako. Ako is the seat of the sugar industry and is a growing and important industrial center. This will be the first private line in Formosa, except the sugar plantation railways.

An application for a license to construct a 30-mile railway from Hatto to Zuiho (gold-mining district) was presented to the Government office on January 10.

SIBERIA

Amur Line.—It is reported that a single track of rails has been laid on the ice across the Amur River at Khabarofsk and that a provisional railroad has already been constructed about 100 miles inland, paralleling the Amur River. The road is lightly constructed with frozen ground and snow and is being used this winter for provisioning a large supply camp of the Amur Railroad.

Work has already commenced on the tunnels through the Hingan Mountains, and a great amount of activity is seen along the entire line of the future railroad. In the middle of January the Government was purchasing large quantities of wheat and oats in the Amur Province, paying about 5 cents a pood (36.112 pounds) more for it than were any of the flouring mills.

The high cost ($7,725,000) of the bridge to be constructed over the Amur River at Khabarovsk has brought out the idea of building a tunnel under the river in place of the bridge. The bridge in question is to be between 7,350 and 7,560 feet l ng; and in order not to interfere with navigation, it should be at least 42 feet above high-water mark. The question of a tunnel has been taken under consideration by a special committee in St. Petersburg, which held its first meeting December 9, 1911.

Quicker Transportation.—The Vistula River Railway lines have introduced direct freight connections between Warsaw and Siberia, by means of which the transportation of goods from Russian Poland will be shortened from 16 to 20 days. The line runs from Warsaw to Moscow via Brest, Minsk, and Smolensk.

SIAM

Railway Extension in Siam.—From unofficial sources it is learned that extension of the Northern Siamese State Railway to Chiengmai has been decided upon. The distance from Bangkok to Chiengmai by this route is 470 miles and the proposed extension embraces 140 miles of the distance.

About three years ago it was announced that the Northern Railway would only be extended as far as Sala Meh Puak, and that the Government would take no additional loan for extending this line farther north, and at the same time it was also intimated that a loan of $7,300,000 would probably be required if the line were to be carried on to Chiengmai. The details for the present financial program, however, are still under consideration. It is understood that the cost of this extension will be heavy, as in order to reach the northern capital a low range of mountains has to be crossed or gone through.

The line from the present terminus, Dene Chai, will go via Pang Puei, tapping the Muang Long plain, and, crossing the Rivers Meh Yome and Meh Vang, will emerge on the Chiengmai Plain through a tunnel nearly a mile in length. This extension is important for the development of northern Siam, with its possible resources in agriculture, mining, and forestry.

Further extension of this railway to the northern frontier would suggest connections with possible railway systems of the British-Shan States and southern China.

Royal Siamese Southern Railway.—Eventually to make it possible to travel by train from Bangkok to Penang, the Royal Southern Railway is one of Siam's most interesting present undertakings. Steady progress is being maintained in the work of constructing the line on all sections.

From Singora northward the line has been carried about seventy kilometres, and from Trang the rail-head is some sixty kilometres. Eighty-four kilometres of rails extend from Petchaburi southward towards Tung Sawng, where the Singora and Trang lines will meet. Construction has also been started at Takham, and a start will be made at Chumphon later in the year. Earthworks for the line which will connect Nakawn with the main line have already been put down, and considerable progress has been made with the tunnel on the south side of Tung Sawng, which has been under construction for some months.

The following tenders have been accepted for locomotives and rolling stock for the Southern Line of the Royal State Railways.

Locomotives (tenders for which were opened on 20th January 1912):—

North British Locomotive Co. Ltd., Glasgow, whose tender amounted to £24,595 c. i. f., and £20,900 f. o. b.

Ballast Wagons (tenders for which were opened on 30th January 1912.)—

The Metropolitan Amalgamated Railway Carriage and Wagon Co. Ltd., Birmingham, whose tender amounted to £31,025-12s c. i. f., and £24,122-12s f. o. b.

Covered goods and other wagons (tenders for which were opened on 2nd March, 1912):—

The Brush Electrical Engineering Co., Ltd., Loughborough, whose tender was £9,598 c. i. f., and £7,635 f. o. b.

Siamese Northern Railway.—The construction of the Northern Railway, which has been in abeyance since 1909, has again been taken in hand, says the *Siam Observer*.

Work was started a couple of months ago from the present terminus and the second section is now under construction, while one of the divisional engineers, has left for Meh Pauk, the rail-head, with a large party to take charge of the almost completed first section. The opening of the whole line to Chiengmai will take at least five years as Government finds it impossible to be other than economical in view of the opening of the Southern Line and other public works which require closer attention. The distance from Bangkok to Chiengmai is 666 kilometres out of which 437 kilometres are open to traffic. Although there are only another 229 kilometres to be constructed, this portion of the railway is the most expensive and difficult owing to the hilly nature of the country through which the line has to pass and the difficult tunnelling required. There will be one long tunnel of about a mile in length between Lampon and Chiengmai, besides other shorter tunnels which have not been located yet as the survey of the track is not completed.

Mr. Altmann has been despatched to superintend the work at a point about half way between the present terminus and Pang Buei, surveying the land where it is proposed to construct a tunnel. This is one of the most difficult parts of the country to be traversed by the new line.

Tenders will shortly be invited for the supply of rails and small accessories.

Railway Operations in Siam.—According to a recent report of the Siamses State Railways for the fiscal year ended March 31, 1911, the gross earnings were $1,674,903 United States currency and the working expenses $661,744, leaving net earnings to the amount of $1,012,159, an increase in net earnings of $52,088 as compared with the previous year. Passenger fares yielded 62.41 per cent of the gross earnings, and the receipts for goods and live-stock traffic 36.05 per cent. Of the passengers, 98.54 per cent travelled third class.

Construction was begun on these railways in March, 1889, and at the end of March, 1911, there was a total of about 579 miles open to traffic, at a total cost of $21,784,771, and on that capital cost a net profit of 4.11 per cent was earned last year.

Character and Volume of Traffic.—The total passenger traffic on all the State railways for the fiscal year 1910-11 was 3,155,160, the average fare paid per passenger was 33 cents, and the average distance travelled per passenger 28 miles.

The number of live stock forwarded from the different sections during the year amounted to 137,699 head, against 111,888 for the previous year. The amount of goods carried reached 314,819 tons, an increase as compared with the previous year of 64,348 tons.

Of the total amount of merchandise carried, the bulk went from Bangkok to Paknampoh, Korat, and Utaradit (Tha Sao). During the year 922 tons of corrugated iron, 1,452 tons of cement, 1,140 tons of cloth and clothes, 3,775 tons of salt, 1,161 tons of tobacco, 4,142 tons of kerosene oil, and 1,500 tons of sugar were distributed from Bangkok to the various points on the railway.

Among the products carried to Bangkok were 482 tons of raw cotton, most of which came from places to the north of Paknampoh, the amounts for the two preceding years being 60 and 342 tons, respectively; 68 tons of cardamoms; 1,836 tons of hides and horns, which came from Korat and Paknampoh; 991 tons of sticklac and gum benzion, most of which came from the north; 556 tons of resin; 35 tons of sandalwood and 124,991 tons of paddy.

These statistics are from the report of the Director General of the Siamese State Railways and, although they give a fair idea of the commercial activities of the Kingdom by land, it should be taken into consideration that perhaps the greater part of these activities are carried on through the numerous rivers and canal systems.

Private Railways.—The Packnam Railway runs from Bangkok to Packnam, a fishing village at the mouth of the river Me Nam Chow Paya, a distance of 12 miles. A dividend of 15 per cent on a capital outlay of $222,000 was realized last year. Passenger traffic and transportation of fish to Bangkok are its main sources of revenue.

The Tachin-Meklong Railway extends from Bangkok to fishing villages of the above names on the rivers Tachin and Meklong. Its length is 41.60 miles, and a dividend of 5 per cent was paid on a capital of $825,100.

The Phrabad Railway is 12 miles long, and was built from a village called Tarua on the Northern Railway, 67 miles from Bangkok.

FEDERATED MALAY STATES

F. M. S. Railways.—The Malay States Government Information Office points out that with a view to the further development and opening of the country, the Government of the Federated Malay States is pushing forward the extension of their railway system. The Railway Department will be authorised to expend nearly £600,000 in new construction work this year. By far the biggest job will be the Pahang-Kelantan line, which will eventually join the Siamese system. The Department will also begin the extension of the line from Province Wellesley into Kedah on the north, the deviation of the main line from Kuala Lumpur to Salak South, and the completion of the Kuala Selangor line, while a sum of nearly £80,000 will be spent on a branch line opening up the Rawang coal field, which promises to give a valuable new industry to the Malay States. Seven new locomotives and a large addition to the rolling stock, both passenger and goods, will be made during the year. The survey of the line northwards is not completed, but it is being rapidly pushed forward as far as Semiling, midway to Alor Star, and will be finished in five or six months.

F. M. S. Railways.—The first railway opened in Perak was in 1885, a short length from Port Weld to Taiping, and the first in Selangor was in 1886 connecting the port of Klang with Kuala Lumpur. Since then additions have been made whenever the finances of the States permitted, until at the end of 1910 there were 658 miles of railway open in the Peninsula. The capital account now exceeds six millions sterling and there is a profit on working of 4⅓ per cent.

This magnificent work has been constructed out of surplus revenue without having recourse to any loans, and there is yet much to be done.

In Selangor a line is under construction along the whole of the coast line from the mouth of the Selangor river to Klang.

In Perak a line will, it is hoped, be soon commenced to connect Gopeng with Ipoh. The Pahang line now at Triang is to be continued to the northernmost border of Kelantan and the Federated Malay States Government is, under the Treaty with Siam, bound to lend that Power four millions sterling to connect the Kelantan railway with the existing system at Bangkok. The money is to be paid in fixed annual instalments, and the loan is repayable in, I believe, forty years. The railway is to be built to the satisfaction of British engineers in the employ of the Malay States.

PHILIPPINE ISLANDS

Line to Baguio.—Engineers of the Manila Railroad Company have completed the difficult survey for the new Baguio railroad extension, which will connect the summer capital to the main line of the Manila Dagupan Railroad at Aringay within two more years, and the surveys have been forwarded to the Governor General for approval by Inspecting Engineer William V. Van Blarcom, of the office of the supervising railway expert, who is supervising the project from the Baguio end of the line.

The general plan of the railroad route within the boundaries of the city of Baguio reservation were approved some time ago by Governor General Forbes. A force of about 1,500 Igorot laborers has been working on the grades in Baguio and preparing sites for the freight and passenger depots. The freight depot is to be built on a large cut-out on the hill just opposite that on which the Naguilan trail from San Fernando enters Baguio, near the municipal and provincial building. From the freight depot the line follows the hillside on a level above the Baguio hotel road until the Benguet road is reached beyond its intersection with the Governor Pack road and Military cut-off, where the railroad must cross the Benguet road on a steel trestle, coming in back of the administration building of government center. The passenger depot will be placed there on a site convenient to government center and Sheridan drive, leading to Camp John Hay.

Construction supplies and railroad materials have been sent up over the Benguet road to be in readiness to start work in earnest upon

the grades surveyed as soon as the plans are approved. As many laborers as can possibly be handled and kept supplied with material will be hired by the company. This will be one of the chief concerns of the construction foremen.

FEEDERS FOR PANAY.—Secretary Elliot has alloted P50,000 as Iloilo Province's share in the appropriation for construction work. This money will be devoted to building railroad feeders to connect with the line now running to Capiz, and will reach out and tap several rich sections. It is not certain yet just what sections will benefit by this allotment.

SUMATRA RAILWAYS.—The Nederlandsche Staatscourant (The Hague) of January 14 and 15 contains a decree providing a supplementary sum of 1,000,000 gulden (about $402,000) for constructing railways in South Sumatra.

CAR-WHEEL TESTER.—For one of the Japanese railways a massive up-to-date machine for testing the weight carried upon each wheel of their largest locomotive has been made by W. & T. Avery, of Birmingham. It has a capacity of 360,000 pounds.

IRON AND COAL PRODUCTION IN CHINA.—In the course of a recent report the American Cousul-General, George E. Anderson, of Hongkong, writes:—

While it is probable that many of the reports of extraordinarily rich ore deposits and unusually fine coal deposits that have long been a common feature of discussion of China's natural resources and latent commercial and industrial possibilities were greatly exaggerated, enough is known of some of the deposits to warrant the statement that China is well provided with fuel and ore for iron and steel development indefinitely in the future. At present six notable domestic sources of coal are available in China—one in the mining country centring about Chinwantao above Tientsin known as the Kaiping mines; another in the mines in Shantung Province, known as the Hungshan and Fangtse mines; a third in Honan along the Hankow-Peking Railway and operated by the Pekin Syndicate; another in Kiangsi-Honan border country south of Changsha and known as the Pingshiang mines; a fifth in the Chingching mines in Chihli Province; and a sixth in the Japanese mine at Fushun in Manchuria; and various other smaller fields in few of which development upon any modern scale as yet has been attempted. The only modern iron works in China producing iron upon a modern basis and by modern methods—the only works producing pig or steel that may be counted as a part of the available supply of the world—is the Hanyang Iron and Steel Works near Hankow. The president of this establishment has informed this Consulate that 303,076 tons of ore were taken from the Tayueh mines in 1910, and 130,000 tons of pig iron were produced at the Hanyang works, of which 14,034 tons were shipped to Shanghai, &c., 29,167 tons to Japan, and 16,100 tons to the United States. The Chinese exportation of iron ore in 1910 amounted to 196,000 tons. A practically unlimited increase in the production of coal and iron is only a matter of increased demand and increased investment.

ROADS AND BRIDGES

OIL FOR ROADS.—Secretary Charles B. Elliott of the department of the interior, has approved an allotment of P40,000 to the bureau of public works, for the purpose of continuing the experimental work with asphaltic oil and other bituminous binders on the first class roads leading out of the city of Manila. This allotment of funds will enable the bureau to make substantial experiments with the 75,000 gallons of asphaltic oils purchased from funds made available last year in an allotment of P31,600.

BRIDGES AND ROADS, P. I.—The following loans have been authorized by the Governor General under the provisions of Act 2883, from the gold standard fund.

To Occidental Negros, for the construction of the Imbang bridge, P15,000.

To Batangas, for the construction of the Sabang bridge, P45,000.

To Batangas, for the construction of the Bauang-Taal road, P50,000.

The sum of P1,600,000 of the P4,500,000 made available for public works in the islands by the gold standard fund has already been loaned. To date 23 provinces have benefited. Nueva Ectia leads off with a budget of P180,000, Ilocos Sur is next with P162,000, Pangasinan third with P144,000 and Ambos Camarines fourth with P100,000. The loans to the first three provinces named will be used in constructing bridges, while Ambos Camarines will use its loan for road and bridge construction.

The Secretary of commerce and police is allotting P500,000 for road and bridge work, distributed on the basis of population, to the thirty-one Christian provinces and the provinces of Mindoro, Palawan and Batanes, from the funds appropriated by Act No. 2052.

From the funds appropriated by Act No. 2059, the secretary of commerce and police has made the following allotments to-day;

P5,000 to the province of Rizal to repair the Taytay-Antipolo road,

P15,000 to the province of La Union for the Naguilian-Ripisuan road;

P25,000 to the province of Nueva Ecija for the Manila-North road;

P25,000 to the province of Pangasinan for the Villasis-Urdaneta-Binalonan road; and

P50,000 to the province of Iloilo to construct roads as feeders to the railway line.

HOWRAH BRIDGE, CALCUTTA.—The Committee of experts, appointed to go through the tenders for the new Howrah Bridge, recommended the design submitted by a German firm. The cost amounts to £555,000. If the contract is given elsewhere, the German firm will receive a prize of £3,000.

PHILIPPINE BRIDGE FUND.—The Acting Governor General has given authority for the loan of P240,000 of the gold standard fund for the construction of bridges in Bulacan province. This fund together with other sums to be allotted from funds already appropriated will provide for bridge construction that will take several years to complete.

INDUSTRIAL PLANTS

FORMOSA NEW PRINTING COMPANY.—By the amalgamation of several printing companies and individual concerns at Taihoku, the capital, a new corporation has been formed, with a capital of $100,000 gold. The new offices will be erected in Butai-gai, Taihoku, Formosa.

FORMOSA GAS LIGHTING.—The Taiwan (Formosa) Gas Co. has obtained a 28-year franchise in the city of Tainan, and intends to begin operations about the time the Government commences constructing waterworks in that city. The bill for the waterworks is now before the Imperial Diet. Tainan is the second city in the island and was the capital during the Chinese régime.

FORMOSA, SUGAR MILLS.—The Taiwan Seito Kaisha, which has absorbed the Formosa Sugar and Development Co. and the Iki Seito Kaisha, will improve and enlarge the equipment of these new properties. The absorption of the Formosa Sugar & Development Co. removed the last foreign (British) company engaged in the manufacture of sugar. The Taiwan Seito Kaisha is one of the strongest and largest companies in Formosa. It owns six mills, all manufactured in the United States (Honolulu Iron Works).

BRITISH CYCLE FACTORY IN JAPAN.—A British cycle manufacturing firm has established at Kobe a branch factory equipped with the most modern machinery. This factory was to begin work in January. It will be able to turn out complete bicycles, importing only the steel tubing and the chains and certain accessories such as saddles, bells, and lamps. It is proposed shortly to begin manufacturing bicycle saddles in Japan. The factory is expected to turn out 1,000 to 1,500 bicycles a month with its present plant, which can be enlarged if necessary. Probably three grades of bicycles will be made to suit the requirements of the market. In addition to complete bicycles, bicycle parts for sale to assemblers throughout the country will be produced, and also jinrikisha wheels, for which a good demand is anticipated.

YOKOHAMA INDUSTRIAL ENTERPRISE.—The municipal authorities are continuing a very active campaign to secure the establishment of manufacturing plants at Yokohama. Electric railway facilities are being extended and suitable tracts of land are being offered under inviting terms. Reductions in taxes are also offered as inducements, application therefore being made through the mayor of Yokohama.

In the industrial district of Yokohama a wood-pipe plant and electric wireworks have recently been established, and a rope-manufacturing industry and a lead-pipe factory will shortly be constructed. The Standard Paint & Composition Co., an American industry, is numbered among Yokohama's new industrial establishments.

In addition to exemption from taxes for a number of years, water and gas are to be supplied to Yokohama industries at specially reduced rates.

MACHINERY FOR FORMOSA.—The Formosan Government has made two important contracts with American firms.

The first contracts is for the purchase of a steam sawmill costing $150,000 gold placed through the Mitsui Bussan Kaisha on behalf of Allis-Chalmers, of Milwaukee, Wis.

The second contract is for a long-handling apparatus costing $25,000, from the Lidgerwood Manufacturing Co., of New York, placed through Takata & Co.

The contract for the purchase of four steam boilers costing $15,000 will go to the Babcock-Wilcox Co. (Ltd.), of Glasgow.

The manchinery is expected to arrive in May and will be used in the exploitation of the Mount Arisan forest districts. The work is to cover five years.

FLOUR MILL.—A new flour mill is to be erected in Khabarovsk. The proprietors are Isaieff Bros., millers in Vladivostok, and A. I. Arhipoff, of Khabarovsk.

BANANA CANNING PROCESS.—A Japanese confectioner in Tainan, South Formosa, claims to have discovered a process by which the banana may be canned. He has interested several wealthy Japanese, and a $100,000 company has been organized to build two factories, in Taihoku and in Tainan. As canned or conserved bananas have been very unsatisfactory, the new process in Formosa will be watched with much interest.

TEXTILE PLANT AT MALABON.—A new Filipino manufacturing concern, which operates under the name of L. R. Aguinaldo and Company, will soon have running 25 hemp braiding machines, an electric power loom and a fishing net machine, in addition to abaca hand looms now in use at the factory in Malabon.

The two machines at present in operation at Malabon each turn out daily three pieces of braid 70 meters long, five mm. wide and one-half mm. thick. These braids, which are used for hats, are of 13 strands each, and the strands are alternately of two and three fibers. One operator can manipulate four such machines at one time.

The present output of the factory is shipped to Austria where it is used for hats.

BUTTON FACTORY.—Orders were placed in America and Europe for large quantities of

button making machinery for La Cencha Button Factory. The purchases include machines of the latest type and will largely increase the output of the factory. The company's plant is to be enlarged and will be ready for the installation of the machinery on its arrival.

Additional capital has been invested in the corporation, which for several years has enjoyed a growing business, and the money is being expended in betterments to meet the expanding trade.

Paco Ice Company.—Articles of incorporation have been obtained by the Paco Ice and Cold Storage Company of Manila. The capital stock is P21,000 and the company is authorized to conduct a general ice plant and cold storage business, deal in distilled water, produce, meats, poultry, butter, vegetables, fish, fruits, and live stock, and to manufacture rattan and bejuco products.

Francis Connor is treasurer of the Company, the capital stock of which is divided into 21 shares of the value of P1,000 each, fully subscribed and paid up. The shareholders are Alicia Connor P7,000; Frederick Hollin P6,000; Francis Connor, P6,000; Thomas L. Hartigan, P1,000; Phil C. Whitaker, P1,000.

Cebu Garage.—Articles of incorporation have been filed by the Parian Garage Company of Cebu, the incorporators being Dr. N. T. Deen, Eduardo de Roda, Jose Gomez, Toma Alonso, and Fred P. Warren.

The capital stock of the new company is P20,000 divided into 800 shares at a par value of P25 each.

Proposed Textile Works.—A textile factory for the manufacture of cloths from native fibers is a promising industry that may be developed in the near future by Italian capital.

The field has been investigated by Signor Oddino Morgari, an Italian capitalist and member of the Italian chamber of deputies, who has spent several months in the Philippines studying the various kinds and grades of fiber produced here, with a view to establishing in Manila a textile factory for the manufacture of cloths from native fibers.

San Antonio Central Sugar Mill.—The new sugar central owned by Messers. Urquijo Escubi and Zuluaga on their large estate seven miles east of La Carlota Negros P. I. was inaugurated, in March.

The mill is composed of six rollers; the first is a crusher, with Diamond rolls. Through the Diamond crusher the cane passes through the mill. The bagasse is conveyed from the last set of rollers and dumped directly into the furnace. After being extracted the juice runs into pipes that conduct it into the heaters. From the heaters the juice is pumped into the four 500 gallon clarifying tanks, and after being limed and defficated is let down into six clarifying tanks of 600 gallons each. From here the clear liquid is run through the triple effect, evaporators, and then discharged into the vacuum pan supply tanks, and then the juice, which is now a pure syrup, is rum into the vacuum pan to a crystalized point, and then let into the mixer, and from there on to the centrifugals as required. After this it is bagged for shipment, a finished product, 98 per cent pure. The strike is discharged from the vacuum pan direct to tanks; and after about a week is drawn out into the centrifugals.

One strike of the vacuum pan is five tons of sugar, and three strikes can be made in twenty two hours, ensuring an output of 240 piculs in a run of twenty two hours.

In July, 1911, the engineering from of Messrs. Strachan & MacMurray of Iloilo sent the order to Glassgow for this mill. With such a limited time at their disposal, the contractors had the central built, equiped, and ready for grinding by March first.

The estate on which this central is located consists of about one thousand hectares, or twenty-five hundred acres.

Thi sis the second mill to be inaugurated in Negros. The first was installed on the estate of Senor E. de la Rama, at Talisay, and this mill is also doing good work and coming up to the expectations of its owners.

The Manila Gas Franchise.—Manila's municipal board has granted the Schweizerische Gasgesellschaft of Zurich, Switzerland, permission to construct its gas plant on the Gonzales property, north of the extension of Calle Isaac Peral, in Paco. In the treasury of the insular government there is a deposit of P50,000, a guarantee by the company that the obligations of its franchise shall have been fulfilled within 23 months from December last. The company paid P125,000 for the franchise.

The resolution of the municipal board granting the authority company to build its plant follows:

"Whereas: the gas franchise to the Schweizerische Gasgesellschaft provides, under Section 11 of said franchise, that the grantee shall begin the construction of its plant in the city of Manila within nine months from the date of the granting of permission to construct by the municipal authorities; and

"Whereas, Section 12 recites as a fact that the said Schweizerische Gasgesellschaft has deposited with the Insular Treasurer the sum of P175,000 for the payment for said franchise and as security for its faithful performance of all the conditions of said franchise and of all obligations imposed upon it; therefore.

"Be it resolved by the Municipal Board of the city of Manila, that the Schweizerische Gasgesellschaft be, and it hereby is, granted permission to construct its plant in the city of Manila under terms and conditions set forth in its franchise."

Work is to begin by July 1, and it is believed that the plant will be completed by the end of the present year.

The estimated cost of the plant complete with tanks and storage is P4,000,000.

The gas plant will be erected in Paco district, close to the Pasig river and almost directly opposite the San Miguel brewery. This site, which comprises an area of 90,059 square meters, was purchased some months ago from Harold M. Pitt by Judge W. A. Kincaid, attorney for the Schweizer Gasgesellschaft, the syndicate which obtained the gas franchise and contracted with Mr. Grossmann for the construction of the plant. The price paid for the site was P90,059, or one peso a meter.

The contract includes the construction of seven buildings, one gas tank and two subterranean tar tanks, and the laying of from 70,000 to 80,000 meters of gas pipe. Most of the buildings will probably be constructed of reinforced concrete. The furnace structure will be of sheet iron, and,

The seven buildings to be constructed are: a furnace structure, an apparatus house, a building to include store house and repair shop, a structure to serve as coal bunkers where the gas-producing coal for the furnaces will be stored, a meter house, an office building which will also serve as residence for the chief gas-fitter and other white employees, and a residence for the general manager.

The gas tank will have a capacity of 7000 cubic meters. The two subterranean tanks will be used for the collection of tar which is derived from the gas furnaces and which will be sold in the local market.

Yunnan's Industries.—The latest "port," or, inland mart, to be opened by the Chinese Government to foreign residence and trade is Yunnanfu, the capital of Yunnan. It is not a "treaty port," but was voluntarily opened by the Government following the completion of the French Yunnan Railway, which connects Yunnanfu, via the important mining district of Mengtsz, with the Tonkin border at Hokow-Laokai. The city stands in the center of an elevated plain over 6,000 feet above the sea and of unusual fertility and salubriousness for southern China, and has a population of 85,000. It already possesses a mint, an arsenal, an electric-light plant operated by hydraulic power, a flour mill, a tannery handling 1,000 hides a month and turning out shoes, saddlery, accoutrements, etc., for the new army, a provincial assembly hall built in foreign style, new law courts, new prison buildings, etc., and has other innovations under way. Several foreign firms have located in the city and many of the native merchants have erected new and more pretentious shops—all looking for the business which is confidently expected to follow at an early date. (C. R.)

Iron Drums as Receptacles for Bean Oil.—Iron drums as receptacles for bean oil for over-sea export are found to be too unwieldy and also encounter a customs duty in Japan, in case of not being reexported within a fortnight of their importation. They are dutiable at 1.95 yen (yen=$0.498) per 100 kin (kin=1.323 pounds). A Yokohama firm dealing in fish oils used old drums experimentally, but although satisfied of their being proof against leakage, could not use them, owing to the sudden advance of steamer freight, from England to Japan, from $1.20 per 40 cubic feet last year to $2.40 this year, and to the other disadvantages named. This Yokohama firm, which exports large quantities of fish and other oils, is trying to solve the problem of receptacles by planning a cask which meets all requirements. With kerosene-oil cans, which are most commonly used for bean oil, there is a leakage of 3 or 4 per cent.

The iron drum suggested as a substitute by Japanese Commercial Commissioner Tawara, at London, is U-shaped and manufactured by the Steel Barrel Co., London, being quoted in the catalogue at about $11 each. It is 41½ inches high, 30⅛ inches in diameter, and weighs 230 pounds; 4 drums hold 3 tons. The iron plate of which it is made is about ⅛ inch thick.

The new bean-oil mill of Kiosensha & Co. (Japanese), at Old Harbin, has been completed, inspected, and passed by the technical and sanitary committee of the Chinese Eastern Railway, and will soon be in operation.

New Industries in Indo-China.—New industries are being established on an increasing scale. Three large cotton factories have been started and are reported a great success on the whole—one at Haiphong with 25,000 spindles, one at Nam Dinh with 24,000 spindles, and one at Hanoi with 10,000 spindles. The three factories produced somewhat over 351 metric tons of cotton yarn from native cotton during last year.

In Hanoi there is a large ice factory, a match factory, a large paper-making establishment about to be put in operation, several distilleries, a brewery, furniture factories, and similar establishments. The great cement establishment at Haiphong is already one of the notable factors in export trade. During the past 10 years the cities have been laid out upon a modern plan, great waterworks establishments have been installed, the cities are lighted by electricity, the larger ones are equipped with tramways, telephone, and similar conveniences and even a subsidized opera season in theaters of more than ordinary quality is a feature of the life of the people.

Siberia.—A new modern sawmill is to be erected by Mr. Kusin at Station Iman on the Ussuri Railroad, for which he has received a grant of 2.7 acres of land from the railroad.

A wax and oil factory is about to be established at Station Ussuri on the Ussuri Railroad, eastern Siberia, for which the railroad will grant an acre to Mr. Bliakin, the proprietor.

New Automobile Co., Japan.—Messrs. K. Nezu, T. Mayekawa, E. Sugihara, K. Okazaki, S. Okuda, T. Kadono, and other business men of Tokyo and Nagoya have organized a company for the manufacture of automobiles and bicycles. The company will be a joint-stock establishment with a capital of 2,000,000 yen, and is called the Automobile and Cycle Company. The promoters have secured the support of Messrs. B. Nakano, S. Satake, S. Ohashi, and other influential business-men.

New Sugar Centrals, P. I.—A Correspondent from Bacolod has informed the Cablenews that it is now an assured fact that there will be established a sugar central at La Carlota, Negros Occidental. Eleven planters, including four of Yuchausti and Company's planters, have signed contracts with E. Sendres of the Philippines Bank (Banco Español Filipino) to furnish their cane to grind if the central is established sufficiently large to turn out one hundred or more tons of sugar daily. The agreement, it is understood, is to allow forty-five percent, to the mill and fifty percent, to planters. The bank will administer the central mill and will deduct eight percent, interest on the investment. Sugar centrals are being installed or arranged for all over Negros and the planters will, as a result, soon be getting a far greater percentage of sugar from their cane than from the old, antiquated mills, besides turning out a better grade of sugar, receiving therefore, of course, a better price than formerly. After the bank is repaid for the investment, the central mill is to go to the planters.

New Steel Company.—Baron Shibusawa, Messrs. Kihachiro Okura, Motojiro Shiraishi, and others are organizing a steel company with the object of manufacturing steel ingots and steel tubes. The company will be styled the Nippon Kokan Kaisha (Japan Steel Tube Manufacturing Co.) and have a capital of 2,000,000 yen, three-fourths of which will be taken up by the promoters.

Soya Bean Mill, Sweden.—The U.S. Consul Stuart J. Fuller, of Gothenburg, states that for installing a plant to work soya beans from Manchuria, the Aktiebolaget Goteborgs Risoch Valskvarn (Gothenburg Rice and Roller Mill Company) has increased its capital stock from 794,000 crowns ($212,792) to a minimum of 2,000,000 crowns ($536,000) and a maximum of 6,000,000 crowns ($1,608,000). The establishment of such a plant at Gothenburg has been discussed for several years. The plant will be the first of its kind in Sweden.

The new enterprise is allied to the Swedish and Danish East. Asiatic companies, and with similar plants at Copenhagen and Stettin, and Danish money forms part of the capital. The two East Asiatic companies referred to operate a joint steamship service to the Far East, and the problem of return cargo for the ships that go out with paper, pulp, timber, and iron is important. This explains their interest in developing uses for Manchurian beans. It is planned to expend 1,500,000 crowns ($402,000) in a plant capable of handling 30,000 tons of beans annually, and so designed that it can easily be enlarged to 50,000 tons capacity.

New Weaving Factory:—The Mitsui Bussan Kaisha has decided to inaugurate a weaving factory to be named the Asahi Boshoku Kaisha, for the production of grey-shirting and other cotton cloths, with a capital of 5 million yen. The promoters met on the 31st ult. when it was decided to place about one-fifth of the shares on the market in the middle of this month. About yen 3,500,000 of the capital is to be sunk in machines, etc. And if there is a prospect for successful issue of debentures only one half of the capital is to be paid in for subscription. A majority of the shares is to be taken up by the Mitsui family and other parties concerned. The factory has for its object supplying the products to Manchurian and Indian markets.

Chosen Cotton Co.—The Chosen Cotton Company mooted originally by the influential members of the now defunct Il Chinhoi of Korea is reported to be in a fair way to successful consummation, it having been decided to increase the capital to two million yen divided into 40,000 shares. The supporters of the scheme mainly consist of Chosen peers. The promoters met quite recently when the organizing committee was elected with Count Song Pyongshan for chairman, and 30,000 shares have been allotted to the promoters and supporters of the scheme. The general public will be invited shortly to subscribe for the remaining 10,000 shares.

Japan Paint Company.—The formation of the Japan Paint Company for the purpose of manufacture and sale of a paint invented by Inspector-General of Naval Construction Harada which was recently patented by the Patents Bureau is said to be nearing its consummation.

The capital is fixed at yen 2,000,000. Amongst the promoters are Baron Goto, Baron Takei, Messrs. Ikeda, Matsukata Ono. Otaguro and several other prominent names in business circles. The promoters are to meet on the 20th instant to consider the matter of the allotment of the shares and other necessary measures relating to the organization of the corporation.

Bamboo Pulp.—The Mitsu Bishi firm has for a few years past been making experiments on the manufacture of bamboo pulp which having proved successful, the firm has quite recently established in Formosa a factory for the manufacture of bamboo pulp, which was opened to business from this month. The factory is now capable of producing about 25,000 tons of pulp a month but the firm purposes to bring the production up to 50,000 tons in the near future. It is stated that the cost of production of bamboo pulp being greater than the price of imported pulp, it would not pay to use it for manufacture for foreign paper. Besides it is more suitable for manufacture of Japanese paper. The firm has despatched an expert to the paper mills to explain the use of the pulp for the manufacture of Japane e paper. While on the subject we note that discovery has been made in Karafuto of the paper material popularly known as ozundra. Mr. Arakawa has succeeded in discovering the process of bleaching the material, for which he has secured letters patent. A small factory will be established for further experiment.

ELECTRIC LIGHT AND POWER PLANTS

Electric Light and Water-works at Swatow.—During 1909 and 1910 a new electric-light plant was erected, the work being in charge of Arnold, Karberg & Co. The machinery consists of 4 Young's Lancashire boilers, 2 Babcock and Wilcox water-tube boilers, 2 Worthington feed and fire pumps, 1 Cameron (New York) surface condenser, 4 Bells and Morcam (Manchester, England) self-lubricating engines, and 4 direct-current generators with switchboard (Allegemeine Elektricitats-Gesellschaft, Berlin). The city is wired with mains feeding sub-mains through section boxes. Consumers are supplied with 220 volts, and the number of lamps installed at the beginning of 1910 was about 4,000. All streets are lighted by 25-candle power lamps at intervals of about 80ft. The price to consumers is fixed at c.30 Mexican on the first 1½ units and c.20 on each succeeding unit per lamp per month.

The Hongkong Electric Co., Ltd.—Paid a dividend of 14 per cent. for the year ending 29th February, 1912.

Shanghai Charges for Electricity.—The following revision of the Scale of Charges for Electricity has been authorized with effect from April 1, 1912:—

Lighting—Consumers have the option of payment under either of two tariffs:—

Flat rate of Tls. 0.10 per unit with discount of

5% for a consumption over		1,000	units	per month
7½	,,	1,500	,,	,,
10	,,	2,000	,,	,,
15	,,	3,000	,,	,,
20	,,	4,000	,,	,,
25	,,	5,000	,,	,,
30	,,	6,000	,,	,,

Pagsipi Hydro-Electric Franchise.—The Philippine Government has passed an act authorizing the granting of a franchise for the use of the waters of the Pagsipi River for the purpose of operating a hydro-electric plant to supply the town of Lucban with light, heat and power. Tenders for the franchise have been published.

Baguio Hydro-Electric Project.—To provide electric current to meet the needs of Baguio and furnish power for a large new light plant, ice plant, and pumping station, the municipal board of the summer capital proposes to harness all of the water power available. The city is considering two sources of, either of which or both may enter into the project.

One of the projects is located on the Irisan river, where a fall of considerable volume can be utilized. This fall, however, is at a considerable distance from Baguio and for that reason the main plant may be placed on the Bued river, where the stream forms a considerable fall just below Camp Seven. Sufficient power to supply Baguio with electric current for all purposes it is estimated can be easily secured from either of the proposed sites

G. E. Plants For Japan.—Among its recent foreign indents the General Electric Company, Schenectady, N. Y., has secured orders for four 1,000 kw. two-unit two-bearing frequency changer sets and one 75 kw. two-unit three-bearing direct current generator set for the Tokio Railway Co., Japan; also thirty-three 50 kw. transformers, one 50 kw. testing transformer, four induction regulators, five small motor generator sets and two 200 kw. voltage exciters for the Katsuragawa Hydro-Electric Power Co., Japan.

Liaoyang Electric Light Co.—The opening celebration of the Liaoyang Electric Light Co. was held on May 12th. Mr. Sun made a congratulatory speech and Lieut.-Gen. Ohtani proposed the prosperity of this enterprise maintained under Sino-Japanese Management.

Peking Tramway.—Peking, May 19. The financial arrangements for the proposed Peking tramway have apparently been completed. A sum of Tls. 6,000,000 has been subscribed by Japanese and Tls. 2,000,000 by Chinese. The balance, which may be still necessary, will be raised later on by shares to be offered to the public.—"*Ostasiatischer Lloyd.*"

Bangkok Power Station Tenders.—Tenders for the Power Station at Samsen were opened at the offices of the Minister of Local Government on March 15th, ulto.

The plant included boilers and superheaters, turbo-generators and condensers and pipe work, switchboard, storage battery, travelling crane, and paddy husk elevators and conveyers.

Some firms tendered only for part of the plant required, which is indicated in the appended list by the words "tender not complete." B 1 indicates turbo generators, condensers, and pipe work, B 2 turbo generators, condensers, and alternative type of pipe work.

C. A. Parsons and Co., tender not complete.

Riley Hargreaves Ltd.,
B 1 £71,370; B 2 £75,280

Foster Engineering Co., tender not complete.

Brush Electrical Engineering Co.,
B 1 £70,361; overhead lines, £14,004;
Power Station building, £74,753.

Babcock and Wilcox (agent Howarth Erskine, Ltd.) tender not complete.

Brown, Boveri and Co., tender not complete.

Frazer and Chalmers and Siemens Bros.,
B 1 £70,540, B 2 £69,508;
Power Station building, £13,250.

Dick, Kerr & Co. (agents, East Asiatic Co.),
B 1 £63,917.

General Electrical Co. (agents East Asiatic Co.), tender not complete.

A. E. G., British Thompson Houston and General Electrical Co., U. S. A.,
B 1, £54, 154.
Overhead lines, schedule prices.
General Electrical Co., London (agents, Bangkok Dock Co.)
B 1 £76,900.
Power Station building £43,844.
Brush Electrical Co. (agents, Howarth Erskine Ltd.,)
B 1 £72,681.
Power Station building, £76,891.
Williams and Robinson and Siemens (agents, Howarth Erskine Ltd.),
B 1 £75,240.
Power station building, £76,973.
Bellis and Morcom and Siemens (agents, Howarth Erskine Ltd.)
B 1 £75,128.
Power station building, £76,973.

The combined tender of the three firms A. E. G. (Allgemeine Elektricitats Gesellschaft, Germany), (Chief Contractors), B. T. H. (British Thomson Houston Coy., England), and G. E. C. General Electric Coy., America), has been accepted.

The figure of Tcs. 54,154 included the erection of husk conveyors and elevators. The A. E. G. will instal the turbo-generators with condensers. There will be three of these with a total capacity of three thousand kilowatts, three phase, 50 cycles, 3,500 volts. The turbines are to be of the Curtis horizontal type, directly connected to the generators and running at 3000 r. p. m. The B. T. H. Co. will supply the switch gear, and the General Electric Co. the transformers. Eight Babcock and Wilcox boilers, each with a heating surface of 4,000 square feet, and able to burn husk, oil or coal, will be used.

The current at the power station will be utilised for the pumping station of the water supply, at the Opium farm, and for the various palaces at Dusit Park.

The work of installation will be carried out by the principal contractors, the A. E. G.

Mr. J. E. Burgess of the firm of Arnhold, Karberg & Co., representing the A. E. G., went from Shanghai specially in connection with this particular tender, and will remain on for some time to settle the details prior to the commencement of the work. The station has to be ready within 18 months from the date of the signing of the contract. The tender accepted amounts to £54,154 and this is for the provision of turbo generators, condensers and pipe work. The price given for the overhead lines was according to schedule.

MALACCA ELECTRIC LIGHT PLANT.—A local company has obtained a thirty years licence from the Malacca Municipality to operate an electric light plant, The contract having been let to Messrs. Riley Hargreaves and Company for $49,485. The generating plant will be driven by two horizontal suction gas engines, arrangements being made to allow for extensions to this plant without alteration of the buildings. Mr. P. M. Robinson has been retained as chief engineer. The capital of the Company consists of $15,000 in 15,000 shares. There have been issued 6,600 shares and 5,000 will be held in reserve, 1,600 are issued to the contractors as part payment of contract, and 1,800 have been issued to the promoters or their nominees in full payment of fees and expenses connected with the promotion of the Company.

SIAM ELECTRICITY CO.—An important addition to the power station has been made in two new A. E. G. turbines, installed in connection with the three phase system. Turbines of the same model, although of slightly less power, are to be employed in the Government station shortly to be built.

HARBIN.—The municipal administration of Harbin contemplates offering a prize for the best suggestion and detailed project for the construction of electric tramways in Harbin. The details will soon be worked out, and copies of the specifications will be supplied to all who desire to either participate in the contest.

ELECTRIC ENTERPRISES IN WESTERN JAPAN.—The *Jiji Shimpo* publishes an interesting account by Dr. Asano, Chief of the Electric Experimental Bureau in the Communications Departments, of electric enterprises in Western Japan, where he has been on a tour of inspection.

Electric enterprises in the western districts, viewed as a whole, he thinks, have made remarkable development in several respects. We can still remember the time when we looked with wonder at dynamos of a thousand kilowatts installed by the Tokyo Electric Railway Company. Now they are too common, electromotors capable of generating one thousand or even one thousand five hundred kilowatts of electricity being found almost everywhere throughout the country. So far as Osaka is considered, four generators of five thousand kilowatts are to be installed before long, besides the five dynamos each generating some three thousand kilowatts which the city already possesses. Under these circumstances, it is not too much to say that Japan compares very favourably in this respect with the different Powers of the world, excepting such senior countries in this line of industry as Germany and the United States. In view of the marked progress our country has attained in so short a period, we my safely rest assured of the still brighter future lying in store for our electric enterprises.

What specially attracted my attention was the gas engine of six hundred horse power installed in the Hasa mines in Kyushu. In such quarters as these, where the coal supply supply can be obtained at a very moderate cost, this sort of machine may be used with great advantage for various industrial purposes. The perfect conditions of the water-power electric enterprises in Saga, Fukuoka, Hiroshima, Kyoto and other districts are also worth mentioning. As is well known, our country possesses a rich supply of water-power, and this fact not only convines us of the necessity of encouraging water power electric enterprises, but at the same time inspires us with confidence that such undertakings will prove an unqualified success. Thus far, only high tension currents have been utilized for motor purposes, but there is a tendency gradually obtaining towards the utilization of lower currents. In this context it may be noted that generally speaking, what claims our first and foremost attention in starting water power electric enterprises is the relative conditions of the coal supply and electric undertakings. In those districts, for instance, where coal is cheap, it may pay to start water power electric enterprises even at a comparatively high cost, but in those quarters where coal is high priced, it would never pay to start such enterprises unless the supply of water power be at the cheapest possible rate.

As regards electric railway undertakings, they show very satisfactory results in every part of the country. Viewed from the standpoint of provision and accommodation, it may be generally stated that those which were first constructed are for the most part, poorly provided, while those laid down recently are all up to date. Of late, electric railway enterprisers in this country have undertaken dealings in land as auxilliary work. This sort of enterprise has long been undertaken in Western countries, but in Japan, somehow, no one has thought of such an attempt. As scarcely needs stating, these dealings in land, when undertaken as a secondary work of the electric railway enterprise, can certainly be calculated, in case of an appreciation of the price of land, to make good such losses as the railway business may sometime suffer, and thus to facilitate in no small measure the development of the primary enterprises.

Passing on to electric lighting enterprise, it is marked in every quarter with such thriving prosperity that the supply never equals the demand. In such cities as Osaka the demand for electric lamps by the citizens in general increases by almost a thousand a month. The electromotors are, in most cases, on the steam turbine system, while the steam engines are equipped with mechanical coal suppliers. The merits of the coal supplier lies in a saving of the consumption of coal by some twenty per cent. and also in preventing the production of soot.

By no means less progress is being made in the production of electric apparatus. As the Japanese are a people distinguished for handicraft, and as their scientific knowledge is by this time tolerably developed, this is an industry well worth encouragement.

HYDRO-ELECTRIC DIVIDENDS.—A general meeting of the shareholders of the Uji River Hydro-Electric company was held on the 24th instant when it was decided to declare a 5 per cent. dividend and also to issue yen 3,500,000 worth of debentures to fill the deficit in the fund for the prosecution of the work. The proceeds of the debenture are to be appropriated to the construction of distributing sections in Osaka, etc., and also to make good the deficit calculated to amount to some yen 800,000 after the company's capital of yen 12,500,000 has been all laid out for the completion of the work. The company has no immediate need of funds but has decided to issue yen 3,000,000 work very shortly through the Kitahama and four other leading banks in Osaka, reserving yen 500,000 worth for a future issue. The issuing value of the debentures is put at 98, the unredeemed period being three years, after which the debentures are redeemable in seven years. The debentures carry 6½ per cent interest.

The firm of C. G. Young, Engineering—Construction—60 Wall Street, New York, have been engaged to make an examination and report for a proposed Electric Railway System in Central America, due to Mr. Young's very extended experience in the electric railway field not only in this country but in Central and South America and many other foreign countries. One of the firm's engineers has sailed to make a study of the local conditions.

WIRELESS, TELEGRAPHS, TELEPHONES

IMPERIAL WIRELESS SCHEME.—Announcement is made by the directors of Marconi's Wireless Telegraph Company (Ltd.), of the acceptance from his Majesty's Postmaster-General of the Company's terms for the construction of all the long-distance wireless stations which will be required within the next few years for the Imperial wireless scheme, and which will be erected for the purpose of conducting a commercial telegraph service.

The Company will proceed with the construction of the following stations forthwith: England, Cyprus or Egypt, Aden, Bangalore (India), South Africa, Singapore. It is anticipated that others will follow in the immediate future.

THE TERMS.—The stations will be operated by the Company for account of the Government for the first six months, and thereafter by the Government. The Company will receive a payment of £60,000 for each station, exclusive of site, foundations for machinery and buildings, and the buildings themselves, which, if so required, will be constructed by the Company at cost price for account of the Governments. The terms further provide that the Company shall receive 10 per cent. of the gross receipts of all the long-distance stations so erected for the term of the agreement, which is twenty-eight years from the date of the opening to service of the first three stations. The Government will have power to end the agreement at the expiration of eighteen years, but in that event they

would cease to have the right of use of any of the Company's patented processes or machinery.

WIRELESS STATIONS IN INDIA.—The Pioneer says that steady progress has been made with the formation of wireless stations in India. In the financial year 1910-11 the sum Rs. 49,000 was spent in starting work at Calcutta, Allahabad, Delhi and Jutogh (Simla). In 1911-12 this work has been continued, and a beginning has also been made at Bombay, Karachi, Nagpur and Lahore. The expenditure has been Rs. 6,000,000 for 1912-15. The provision is only two lakhs. There will later on be a heavy outlay on account of payment to the Marconi Company. The equipment of each of the eight stations with the necessary apparatus has been provided for, and India should soon have an inland radio system, while the stations at the ports of Calcutta, Bombay and Karachi will be powerful enough to communicate with ships at sea at very long distances.

P. I. WIRELESS SYSTEM.—The immediate establishment of 14 wireless station, eight of them high power, and the ultimate installation of over 100 smaller stations, perfecting a continuous chain of aerial communication between the islands of the Philippine group, connecting all populated Islands not now touched by cables, and making communication between the principal cities of the islands independent of cables, is the purpose of a bill which has been introduced in Congress. The bill embodies the principal features of the exhaustive report submitted by the Wireless Board appointed by President Taft, which consisted, at the time of its report, of Secretary of Commerce and Police Charles B. Elliott, Lieutenant Colonel William A. Glassford, of the Signal Corps, and Commander Charles M. Fahs, commander of the Olongapo and Cavite naval stations.

TRANS-PACIFIC WIRELESS.—According to an article in a recent issue of the Army and Navy Journal, the bureau of steam engineering of the navy department is contemplating the establishment of a string of wireless stations across the Pacific, with a terminal station situated on the northern coast of the island of Luzon.

Engineers of the department have made a careful study of the strategic and ordinary advantages of such a system, which they say will keep the department in constant touch with the fleet in Pacific waters without having to rely on the commercial cable service.

As yet no plans of a definite nature have been announced, but it is expected that the plan will be adopted if Congress can be persuaded to appropriate the funds necessary to carry out the scheme, approximately $2,000,000.

SIBERIAN WIRELESS.—In order to maintain the connections between the western and eastern parts of Russia, on the one hand, and the western part of Russia and western Siberia, Russia has determined to establish wireless stations somewhere near the Kara Sea, at Nava Arhangelsk(?) and the island of Waigatz. For this purpose the Russian Government has asked the Duma for the disbursement of a million rubles. Russia intends by this measure to maintain communications with western Siberia by making steamers go to the mouth of the river Obi and then up that stream, when the Kara Sea is free of ice and the waters become navigable. This route of communication was recognized as profitable and practicable at the time of the Russo-Japanese war. Since then investigations have been going on, as a result of which it has been ascertained that, in order to learn of the time of the thaw, there is no better means than wireless telegraphy.

NEW JAPANESE CABLES.—The Japanese Department of Communications has completed the laying of a special single cable between Fusan and Shimonoseki. A new cable has also been laid between Tokyo and Nagasaki, which will be opened in May.

The island of Sakito, in Nagasaki has been connected by cable with Kakiura island on the Kyushu coast.

GREAT NORTHERN TELEGRAPH COMPANY.—The 28th of next December will witness the expiration of the Great Northern Telegraph Company's charter of the Shanghai-Nagasaki and the Vladivostok Nagasaki cables. It is thought that the Japanese Government will seize that opportunity to buy up the Company, or, at any rate, to amend the terms of its charter. At present, messages in the Japanese language cannot be transmitted across the wires.

Telegraphic Communication between Imperial Harbour and De Castries is to be established, according to the Priamursky Vedomosti. The only stations of importance on the Russian shore of the Japanese Sea and the Tartar Straits at present are De Castries and St. Olga. In 1911 the line was completed up to Sizimi Bay, a distance of 57 miles. The length of the entire line will be about 220 miles. Another line is to be constructed from Cape Pogibi to the village of Ribnoe, on Sakhalin Island.

CHANGCHUN.—Telephone service has been established between Changchun and Harbin, with the main office at Kwangchengtzu. The Japanese post-office, has communicated with the Russian authorities for the extension of the line to Changchun, and connection between Russian and Japanese territories is expected to be established shortly.

TELEPHONES IN MANCHURIA.—There are 13 telephone exchanges in Manchuria, located in the following cities: Dairen, population 41,809; Liushutan, population 4,622; Tashihchiao, 2,320; Fushun, 5,083; Tiehling, 38,108; Port Arthur, 18,142; Kinchou, 10,751; Liaoyang, 66,869; Mukden, 165,634; Kungchuling, 3,833; Changchun, 38,262 Hsin-minfu, 41,918; Antunghsien, 7,855. The total mileage of telephone wire in the cities is 6,031 miles, and interurbar 2,317 miles.

The service is conducted by the State, except the private lines of the South Manchuria Railway Co., which are operated for its own use. The Yingkou (Newchwang) Hydraulic Electric Co. supplies telephone service for the public at Yingkou.

SIBERIA.—*Army telephones.*—During 1911 the troops of the Priamur military district used portable field telephones of a new pattern, manufactured by Siemens & Halske. The new telephones are carried in a knapsack, and the coils of wire are carried in the same manner. The third battery of the sixth artillery brigade used the new telephones during the fire practice from November 2 to 4, and they give an excellent report regarding them.

Telegraph lines are to be constructed in the north of Asiatic Russia. The budget provides $154,500 for a line along the seacoast from Okhotsk to Petropavlosk, Kamchatka, and $103,000 for a line from Petropavlosk to Ust-Kamchatka. This will also enable the Imperial Bank and the Russian Treasury to make telegraphic remittances to Petropavlo k. Wireless stations will be established at Okhotsk, Tiguil, and Ore.

A telephone system will be installed in Nikolaiefsk on the Amur during 1912.

PUBLIC WORKS

HARBIN.—A report has been prepared for the Harbin town council in regard to the estimated $100,000 deficit in the town budget for 1912 and to provide funds for various municipal improvements. The report concludes that it will be necessary for the municipality to float a long-term loan of about $1,000,000. Should the loan be floated, it is proposed to expend the money as follows: Repairing hospital, building barracks, and completely equipping same, $30,000; construction fire department headquarters, $47,500; construction municipal administration headquarters, $50,000; construction two school buildings, $37,500; construction market place, New Town, $100,000; park, New Town, $15,000; concrete cisterns for street drainage, $55,000; construction electric tramway, $500,000; total, $835,000. Cost of floating loan and balance on hand, $165,000.

INDO-CHINA.—The draft of a law authorizing the Governor General of Indo-China to contract a loan of 90,000,000 francs ($17,370,000), in order to carry out various works of public utility and interest, stipulates that this sum is to be apportioned as follow: Completion of the works commenced under the loan authorized by the law of December 25, 1898, $5,018,000; irrigation works, $3,686,300; construction of roads. $2,123,000; construction of railroads (Dong-Dong to Na-Cham, Vinh to Quang-Tri Mytho to Cantho), $4,496,900; establishment of schools, $289,500; installation of hospitals, infirmaries, medical laboratories, dispensaries, etc., $289,500; installation of wireless-telegraph stations, $115,800; survey of railroads, roads, ports, works of irrigation and of navigation $772,000; miscellaneous and the expenses of negotiating the loan, $579,000.

The necessary annuity to assure the interest and amortization of the loan will compulsorily be entered in the general budget of Indo-China, the payment of it being guaranteed by the Government of the French Republic.

CHOSEN.—The budget of Chosen (Korea) for the fiscal year ending March 31, 1913, estimates a total revenue of $26,116,220, an increase over the preceding year of $1,957,446. The principal increases from ordinary revenue are: Customs, $208,055; ginseng and salt, $204,007; posts, telegraphs, and telephones, $216,857; railways, $711,090, respective increases.

Under the head of customs an allowance of $224,100 has been made to cover the proposed abolition of export duties on rice, marine produce, and "other commodities" after April 1, 1912.

The total contemplated expenditures amount to $26,116,220. The amounts of increase in expenditures appear under the following heads: Government monopolies, $76,694; provincial administration, $135,498; communications, $155,120; railways, $716,857; interest on loans, $325,626; encouragement of industry, $76,530; land investigation, $310,290; subsidies, $271,965; maritime customs, $74,129; Seoul waterworks, $88,563.

Decreases in expenditure of $239,568, through administrative readjustment, and of $229,080 for repairs of roads are proposed.

[The London and China Telegraph states that: "The proceeds of the increased revenue are to be appropriated to the encouragement of the salt business and the improvement of harbours, waterworks, railways, and agricultural land, the protection of forests, industrial products, investigation, cotton cultivation, establishment of public schools, subsidies for coasting services and other public and industrial enterprises."]

MANCHURIA.—The Japanese Government of the Kwantung leased territory is striving to develop various industries, for which $125,000 is devoted. With the object of making Dalny not only the first-rate trading port in Manchuria, but also a port of transhipment for Korean ports, as well as Tientsin and other North China ports, an annual subsidy of $35,000 has been granted to certain local shipping firms engaged in coasting trade. The four steamers receiving such subsidy will soon be increased to five or six.

An annual grant of $5,000 is made to the Fishery Association and the Marine Products

Co. (Ltd.). A special subsidy may also be granted for the export of marine products to South China.

To open a market for Kwantung salt in Korea a $10,000 subsidy was granted. The Government is working hard to promote the sale of salt.

Willow planting is being encouraged. Wicker trunks are now popular, being used both by Chinese and foreigners, so there is good prospect for the manufacture of willow articles. The Government is also distributing free seeds and fruit trees to both native and Japanese farmers. Grape culture is promising, and a subsidy of $5,000 for wine making has been allowed.

Glass factories have started at Dalny and Port Arther. A subsidy is given the industry, which appears promising.

Straits Settlements.—Information has been received that the plans for the new Singapore sewer system are nearing completion and that the project will probably be thrown open to bids by May, 1912.

Loans For Provincial Works, P. I.—Baguio, March 26.—More than a million and a half pesos of the P. 4,500,000 made available for public works in the islands by the gold standard fund has already been loaned. The full list of loans made is given below:

Date on which made	Province	Municipality	Amount	Purpose
1912				
Feb. 5,	Bulacan		P, 36,000	Bridges
,, 6,	Pangasinan		144,000	,,
Mar. 7,	Nueva Ecija		180,000	,,
,, 11,	Occ. Negros		7,500	,,
,, 18,	Ilocos Sur		162,000	,,
,, 11,	Batangas		50,000	Roads
,, 14,	,,		25,000	Bridges
Feb. 28,	La Union		70,000	R. & B. and repmnt of loans
Mar. 8,	Amb Camarines		100,000	R. & B.
Feb. 13,	Capiz		18,000	P. Bldg.
,, 13,	,,		67,500	Bridges
Mar. 6,	Bohol		90,000	,,
,, 11,	Occ. Negros		78,000	,,
,, 5,	Leyte		54,000	,,
,, 18,	Antique		50,000	,,
Feb. 26,	Tarlac		50,000	Roads
Mar. 5,	Samar		68,000	Comp. P. B. & J. B. incl'g.
,, 1,	Iloilo		35,000	Surv. of lands
,, 5,	,,		68,000	B. & C.
,, 11.	Rizal	Caloocan	12,500	Mkt. & Water System
Feb. 27.	Pampanga		37,500	Bridges
Mar. 5,	Sorsogon		80,000	,,
Feb. 29.	City of Baguio		60,000	Pur & Imp. E. L. Plant
Mar. 4.	City of Manila		25,000	Street widening
,, 9,	Nueva Ecija		15,000	Roads
,, 18,	Or. Negros		24.000	Bridges
			P. 1,607,000	

P. I. Public Works Bonds.—The Committee on Insular Affairs has approved the application for a new issue of bonds for public improvements in the Philippine Islands to the extent of P. 10,000,000 providing the money is not used by the Commission exclusively, without the consent of the Legislature, and provided it is not used for purposes of public improvements in the non-Christian provinces.

Construction of Buildings—For the construction of permanent buildings, namely Provincial Prison at San Ramon Farm, twenty-five thousand pesos; storehouse at Zamboanga, ten thousand pesos; district building at Jolo, twenty thousand pesos; district building at Davao, ten thousand pesos; district building at Cotabato, two thousand pesos; district jail at Dansalan, two thousand seven hundred fifty pesos; building for use as an intermediate and high school at Zamboanga, thirty thousand pesos.

Construction of Roads, Bridges and Trails.—For the construction of roads, bridges and trails, namely, Mati-Boston road, fifteen thousand pesos; Davao-Santa Cruz road, forty-five thousand pesos; miscellaneous small bridges, twenty-five thousand pesos; Hijo-Compostela trail, ten thousand pesos; Tamontaka-Estero bridge, twenty thousand pesos; Marahui-Camp Vicars trail, ten thousand pesos.

Construction of Telephone Lines.—For the construction of telephone lines, namely, Dapitan-Baliangao line, three thousand pesos.

Construction of Docks and Wharves.—For the construction of docks and wharves, namely, old wharf at Zamboanga, sixteen thousand pesos.

Purchase of Equipment.—For the purchase of equipment, namely, general equipment, twelve thousand five hundred pesos; road and bridge equipment, thirty thousand pesos.

Nagasaki.—The Municipal Budget for the ensuing fiscal year is as follows: Ordinary expenditure, Yen 665,651; Waterworks expenditure, Yen 152,642; Harbour reclamation works—Expenditure Yen 197,872, income Yen 324,247. Of the ordinary expenditure, Yen 56,158 is for the municipal office, Yen 23,683 for public works, Yen 120,136 for education, and Yen 40,224 for sanitation.

Moro Province Public Works.—The Legislative Council of the Moro Province has appropriated the sum of P. 387,850 to be expended on public works.

SANITATION WORKS IN JAPAN

Before the opening of the World Exposition to be held in Tokyo in commemoration of the fiftieth anniversary of the crowning of the Mikado, the Japanese authorities have decided to install a complete system of modern sanitary sewerage, modeled after that of modern Western cities. As the area of Tokyo is one of the largest of the cities in the world, such a complete scheme of sewerage would require many thonsand feet of sewer pipe. Approximately $17,000,000 to $20,000,000 will be spent in this improvement, and the Tokyo system will be composite in nature, embodying the most suitable features of many cities. It is probable that the Tokyo system, however, will resemble the Berlin sewerage system in many essential features.

The proper authorities to address regarding the introduction of articles for the sanitation enterprise are K. Inuzuka, Chief of the Bureau of Public Works, Home Department, Tokyo, and the Department of Public Works, City Office, Tokyo.

MINES AND MINERALS

SIBERIA

The gold-mining territory in the vicinity of Nicolaevsk is divided into four districts—namely, the Amgun, Okhotsk Udilsky, and Amur. From 1894 to 1909 the various Russian companies took out 950,000 troy ounces of gold, valued at approximately $16,480,000 at a loss, due to the primitive manner of working the mines. The usual method is for the owners to work the rich spots, leaving the other places to be mined on a percentage basis, usually by Chinese and Koreans, a fixed amount of gold being delivered daily to the company, the remainder being sold at a price previously agreed upon.

The principal mines in the Amgun district are owned by the Amgun Gold Mining Co., and are situated about 300 miles from Nicolaevsk. These mines were sold to the present owners 17 years ago for $1,545,000, but have been worked at a loss ever since. In 1909 the company erected a small dredge, which was continually breaking down, so in 1910 a larger one was ordered from Germany, and if it gives satisfaction good results are expected.

There are many smaller mines owned by individuals and companies in this region, but several have been abandoned, and with one exception all were worked at a loss. It has been demonstratrd that the places which are considered poor by Russians can be worked on American methods at a great profit.

Orsk Gold Fields—Installation of Machinery.—The Orsk gold fields are situated about 42 miles northwest of Nicolaevsk and about 18 miles from the Okhotsk Sea, the area of the claim being about 16,000 acres. The mines were originally worked by the Orsk Gold Mining Co., which failed in 1906 after taking out, in 10 years, gold valued at $2,900,000 at a net loss of $772,500. The gold as taken from these mines is worth on an average of $14,67 per ounce, compared with $19.57 per ounce from the Amgun district.

The Orsk Goldfields (Ltd.) is installing the following improvements, which are to be completed in 1911: A 750-horsepower electric plant of 6,600 volts, and a 3-phase, 60-cycle transmission line, 10 miles long, will supply current to the electrically driven bucket dredge, with will have a capacity to dig and separate 7,500 cubic yards of gravel in 24 hours. At the powerhouse site there will be erected a Jeffrey's cable conveyer, 1,600 feet long, for wood, which will be supplied from a combination sawmill and wood-splitting plant, and there will be storage capacity for 6,000 cords of wood. It is estimated that the generating plant will be in operation 24 hours per day for 150 to 200 days in each year. The plant is being installed in duplicate, entirely of American machinery, is designed to operate at highest efficiency, and will cost, including installation, about $450,000. The power plant will be on a small lake with direct water communication with Nicolaevsk via the Amur River, and at this point a small city will be laid out on American plans. Streets with sewerage and water pipes and electrical conduits will be constructed, and the place made thoroughly sanitary. The houses will be of cement, concrete, and brick, and wood will be used in building homes for the officials. When everything is in full operation the population will number almost 1,000.

The new dredge which is being installed is 90 feet long, with a 45-foot beam and 9-foot draft. It has 60 buckets, with a capacity of 7½ cubic feet, and was constructed by the New York Engineering Co. The motors for operating the dredge were supplied by the Westing-house Manufacturing Co., and are 3-phase, 60-cycle, 440 volts each. The boilers and engines were manufactured by the Erie City Iron Works, and the engines are horizontal cross-compound. The generators were made by the General Electric Co.

Placer Mines—Russian Mining Laws.—The other districts near Nicolaevsk have shown no very rich mines, but this can be explained by the fact that little prospecting has been done. There are only placer mines in this locality, and as the gold is very fine, only the latest methods will prove successful.

Many writers in foreign magazines have dealt at length with the difficulties that are put in the way of foreigners mining in Siberia, but these accounts may be treated as exaggerations, as the Russian mining laws are clear, and the Government and officials offer every inducement to foreigners to mine in Siberia. The exception to this is the so-called 100-verst (about 66 miles) zone extending along the seacost, where it is necessary to obtain special permission to mine from the governor general of Priamur district, or higher authority. The laws appear to be fair, and if they are obeyed the officials, instead of putting obstacles in the way of the miners, will prove of great assistance to them.

Output of Gold in Amur Province.—Gold mining is by far the most profitable in the Amur Province. In 1908 there were 790 mines registered, of which 256 were being worked and produced 259,018 troy ounces of gold, against 342,913 ounces in 1907. The average yield per ton of gravel is from 0.04867 to 0.13144 troy ounce. According to figures of the assay offices of the Imperial Siberian Commercial and Russo-Chinese Banks, there passed through these institutions in 1908, 483,390 ounces of gold, valued at $8,615,981

and in 1909, 500,411 ounces. Cleaned gold is valued at about $10,300 per 526.5 troy ounces.

The Siberian Commercial Bank purchases gold directly from the mines, and, after it is cleaned in their assay office, shipments are forwarded every five days under a special guard to Berlin and Paris, where it is held to the credit of the bank, and this credit balance is drawn against by the head office of the Siberian Commercial Bank at St. Petersburg. This method is found most profitable, as when the Government or other banks are called upon to make large remittances to Germany or France, and the exchange rate is consequently favorable, the Siberian Bank is always in a position to meet the demand.

The quantity of gold obtained in the Amur Province from 1893 to 1908 was 4,354,713 ounces, valued at $74,910,356. Mining methods are most primitive, and it was not until the end of the working season of 1903 that the Upper Amur Gold Mining Co. introduced the first dredge into the district, and the same company has experimented successfully in a small way with the hydraulic process. The cost of labor at the mines is 77 cents to $1.55 per day. The prices of necessities are regulated by special inspectors and vary according to the cost of transportation and location of the mine.

The Richest Mining Territory.—The richest mines in eastern Siberia are located in the cabinet lands of the Transbaikal Province, where many important gold mines are being operated by the administration of these lands, and the Government is offering full opportunities for foreigners to mine there. As in other parts of eastern Siberia the mining methods are primitive, the cost of operation being high and the gold-saving process poor. Attempts have been made to use modern machinery and American mining methods, but they have not proved successful, due to lack of technical knowledge and the fact that the machinery was not adapted to the conditions, there being no doubt that many of these mines could be worked at tremendous profit. One serious drawback is the fact that the ground is perpetually frozen. Many of the properties are extremely rich in coarse gold, but the area is not sufficient for dredging on a large scale, nor would it be possible to dredge without the use of jets. The Chargotchinsky mine has recently installed about 1 mile of railway and 30 steel cars. This mine is being operated with profit, despite the fact that the methods are inferior and everything is being done by hand.

Mineral Wealth of Yakutsk Province—Coal Deposits.—Notwithstanding the great mineral wealth of Yakutsk Province, the mining industry is in its infancy. There are rich deposits of gold, silver, zinc, and platinum, and the natives living near the Maya River have been known to use the latter for bullets. Iron has been found in several parts of the Province, and copper exists near the mouth of the Kolin River, and on the Amga River are deposits of cinnabar. Rich deposits of salt and coal are found in several places, the coal fields on the Lena River extending from 66 miles south of Yakutsk in a northerly direction for about 1,200 miles.

The Due coal mine, situated south of Alexandrofsk, in Sakhalin Province, is at present being worked by private interests and during the winter of 1909-10 there were 40,000 tons of coal mined. The leading markets for the coal are Nicolaevsk and Vladivostock, the principal consumers being the Russian Volunteer Fleet and the navy. A new coal deposit a short distance from the Due mine was discovered recently and will be worked during the winter of 1910-11. A small railway has been built from the coast, and it is estimated that the output of the mine will be 100,000 tons annually.

KAIPING COAL-FIELD

Ever since the formation of the Chinese Engineering and Mining Company, Ltd., it has had to encounter strenuous opposition. The Chinese Government has consistently refused to recognize the rights claimed by the Company, and direct and indirect methods have been employed with the object of frustrating the Company's development and challenging its claims to exclusive mining rights in the Kaiping coal-field. It is unnecessary to review in detail the disputes and litigation in which the Company has been involved. We need only refer briefly to the final and most important phase, which has, now, happily, resulted in an agreement for amalgamation to work one of the most important bituminous coalfields in the Far East. The formation of the Lanchow Mining Company, to work in opposition to the Chinese Engineering and Mining Company, within the area over which the latter claimed exclusive mining rights, was only one of the many attempts made on the Chinese to oust the British Company. The latter always maintained—and in this view it was supported by the British Legation —that the Lanchow Mines were an infringement of its rights, and matters may be said to have come to a crisis in January of last year, when the Kaiping Company cut its rates in the hope of effecting by competition what it appeared impossible to achieve by any other means. in the late war that ensued the price of the quality of coal for which the demand was largest was reduced from $6.40 to $3.00 per ton, at which figure it remained until this week. Intermittent negotiations took place throughout 1911, but, without exception, proved abortive. Competition had the effect of materially reducing the profits of both companies, and the Lanchow Mining Company vainly endeavoured to obtain a loan to meet its requirements. At last both companies, realizing the futility of a further struggle along these lines, once more endeavoured to come to terms, and on January 27 last, a preliminary agreement for amalgamation was signed. This agreement was formally ratified by the British Legation and the Chinese Government on March 21, and two days later the Chinese Engineering and Mining Company took over the coal sales of the Lanchow mines.

The formal agreement of amalgamation remains to be drafted, but we are now in a position to give the main outlines of the preliminary agreement. With a view to expanding their business the Kaiping and Lanchow companies agree to form an association to be called the Kai-Lan Mining Administration. The two companies will remain separate, and each will retain its share capital, which is the same in both concerns, namely, £1,000,000 sterling. As regards profits, the shareholders of the Kaiping Company are to receive sixty per cent., and the shareholders of the Lanchow Company, forty per cent., of all nett profits up to £300,000. Nett profits in excess of that sum are to be equally divided, as are also the profits that may be derived from any new business or additional coal shafts. Nett profit is defined as meaning the profit after deducting all working expenses and paying interest and amortisation charges on the Kaiping and Lanchow Companies' existing debentures, and upon the following debentures which are to be raised by the Kaiping Company: £1,5000,000 to be paid to the Lanchow Company for payment of debts; £1,000,000 to be paid to Chang Yen-mao; £50,000 to be paid to the Kai-Lan Mining Administration; and £500,000 to be reimbursed to the Peiyang Viceroy. The only other deduction is 15 cent of the gross profits, or not less than £35,000 per annum, for a joint reserve fund. The Directors of the two Companies are to be elected according to their original regulations, but the Administration will establish at Tientsin a Deliberating Board, to which each Company will elect three members, to discuss the affairs of the Administration, and to report from time to time on its working to the Boards of Directors. All accounts, of both companies, will be kept in English and Chinese, and will be rendered twice a year. It is stipulated that the mining area of the Administration shall be limited to the mining areas of the Kaiping and Lanchow Mining Companies, within which limits no development may be made by other competitors. After the shareholders have been paid £150,000 from the profits, one-fifteenth part of all remaining profits is to be paid to the Chihli Provincial Treasury for the development of industries. The only other condition which is of sufficient importance to deserve special mention, is that after ten years from the date of signing the agreement the Lanchow Mining Company is to have the right to purchase the whole property of the Kaiping Company, at a just price, agreed up on by both parties. A supplementary agreement provides for the raising of the new debentures mentioned above, and stipulates that the final agreement, when signed, can only be determined by the Lanchow Mining Company's purchasing the interest of the Kaiping Company.

The momentous effect of the agreement we have outlined need scarcely be emphasized. It places under joint management one of the richest bituminous coalfields in the world, and at the same time creates one of the largest colliery administrations. The Kai-Lan Administration will have a possible daily output of ten thousand tons, it owns eight main and numerous subsidiary shafts, it employs over 10,000 labourers, apart from its large office and agency staffs. The amalgamation, which will shortly be followed by the elimination or absorption of dual agencies and offices where they exist, will not only effect numerous economies, but will enable the Administration to control the coal supply of North China. The nearest competitors of any magnitude are the Fushan and Pingshiang collieries, but the keen competition in the Oriental coal market may be regarded as precluding all danger of any serious increase in the cost of coal in North China. The amalgamation, therefore, may be regarded with general satisfaction. Not only does it terminate a long-standing and acrimonious dispute; it safe-guards the interests of all parties, removes all possibility of future misunderstanding, and enables Chinese and Foreign interests to co-operate where they have hitherto been in open conflict. Last, but not least, it opens the way for the acquisition of the entire Kaiping coal-field by the Chinese Company within a reasonable period, and in this respect may be regarded as a thoroughly practical scheme for enabling China to develop her mineral resources with the aid of foreign capital, without permanently alienating them from her own control.—"P. & T. Times."

Iron and Coal Production in China.—While it is probable that many of the reports of extraordinarily rich ore deposits and unusually fine coal deposits that have long been a common feature of discussion of China's natural resources and latent commercial and industrial possibilities were greatly exaggerated, enough is known of some of the deposits to warrant the statement that China is well provided with fuel and ore for iron and steel development indefinitely in the future.

At present six notable domestic sources of coal are available in China—one in the mining country centering about Chinwangtao above Tientsin, known as the Kaiping mines; another in the mines in Shantung Province, known as the Hungshan and Fangtse mines; a third in Honan along the Hankow-Peking Railway and operated by the Peking syndicate; another in Kiangsi-Honan border country south in Changsha and known as the Pinghsiang mines; a fifth in the Chingching mines in Chihli Province; and a sixth in the Japanese mine at Fushun in Manchuria; and various other smaller fields, in few of which development upon any modern scale as yet

has been attempted. The output of the mines named during 1910 has been listed as follows:

Mines.	Tons.
Kaiping	1,174,312
Fushun	830,328
Pinghsiang	610,000
Shantung	482,880
Honan	357,005
Chingching	150,000
Total	3,604,525

DISTRIBUTION OF THE COAL—MODERN WORKS. This coal has been used in humerous local enterprises, on various Chinese railways, by Chinese naval vessels, and in Chinese Government institutions like the mints, naval depots, arsenals, and Government factories, in the Hanyang iron works and most foreign factories, and a considerable quantity of it was exported, some to the Pacific coast of the United States. The foregoing figures do not include any output of purely local nature, like that mined along the French railway in Yunnan, the small amount taken out near the rivers for steamers in Kwangtung, or, in short, purely local production anywhere. The amount listed may be termed that coal which has come into the public market in China.

The only modern iron works in China producing iron upon a modern basis and by modern methods—the only works producing pig or steel that may be counted as a part of the available supply of the world—is the Hanyang Iron & Steel Works near Hankow. The president of this establishment has informed this consulate that 303,076 tons of ore were taken from the Tayueh mines in 1910, and 130,000 tons of pig iron were produced at the Hanyang works, of which 14,034 tons were shipped to Shanghai, etc., 29,167 tons to Japan, and 15,100 tons to the United States. The Chinese exportation of iron ore in 1910 amounted to 196,000 tons. A practically unlimited increase in the production of coal and iron is only a matter of increased demand and increased investment.

YUNNAN TIN PRODUCTION:—The value of native exports increased in 1910 over 1909 by 50 per cent, due almost entirely to the increased output of the Kochiu tin mines. The total production amounted to 13,662,000 pounds, or 4,218,800 pounds in excess of that of the previous year, and was valued at $3,954,720. Tin prices ruled high on the Hongkong market during the year and encouraged the mine owners to work their shafts. The excellent record achieved in 1910 may induce the owners to increase the size of the foreign plant imported from Germany. The only other minerals exported in 1910 were zinc, 28,000 pounds; antimony, 122,666 pounds; and orpiment, 12,400 pounds—a poor showing for one of the richest mineral beds of the Empire.

MANCHURIAN AND JAPANESE COAL-MINING COMPARISONS.—Fushun Colliery, of Manchuria (partially described in Daily Consular and Trade Reports for Feb. 26, 1912), is a peer to the Müke Colliery (annual output 1,500,000 tons), the most extensive coal mines in Japan. The Japanese mines of the Kyushu district pay an average daily wage of 60 cents, while Fushun Colliery can obtain any amount of Chinese labor at 22 cents. Moreover, the mining capacity of the Kyushu collieries, which is put at 8,000,000 tons per annum, has attained its zenith, and hardly admits further expansion. It is possible that the present output will be maintained for 50 years or so, but not much longer. Apart from the Kyushu collieries, Japan can count for coal supply upon Hokkaido, with 1,400,000 tons, and Iwaki Province, with 800,000 to 900,000 tons, which, combined with the other sources, make a total of 7,000,000 tons per annum. Of this grand total of 15,000,000 tons, Japan can spare only 3,000,000 tons for export. (C.R.)

HONGKONG COAL TRADE.—In spite of varied conditions in the trade of the port in general the coal trade of Hongkong in 1911 remained fairly steady. The total imports were 1,261,671 tons, as compared with 1,286,330 tons in 1910 and 1,219,930 tons in 1909.

The only notable trade features last year were the disposition to drop some old time supplies, such as Cardiff and Australian coal, and to take new supplies from eastern sources, particularly from portions of French China (Hongay: 139,610 tons) and British North Borneo (Pulo Laut, 37,450 tons). Japanese coals dominated the market as usual, and in that connection it might be stated that for the first time coal from Formosa was imported commercially into Hongkong. This Formosan cargo of 2,080 tons made the total imports of coal from Japanese sources for the year 932,856 tons, as compared with 932,780 tons in 1910 and 924,780 tons in 1909.

Of these imports 606,000 tons were handled by the Mitsui Bussan Kaisha, 125,000 by the Mitsui Bishi Goshi Kaisha, and about 40,000 tons each by Ataka & Co. and Bradley & Co.

Australia dropped out of the market altogether and no coal from that country was imported commercially during 1911, although two years ago over 46,000 tons were brought in. Of Cardiff coal only 5,000 tons were imported commercially and most of that was exported north later, the rest being for account of the British Navy here. Chinese coals, both Kaiping (40,130 tons), and Manchurian (53,575 tons), fell off considerably, and Haifong and Tonkin coal (16,150 tons) also showed reductions.

The rise of Pulo Laut sales has been due to systematic canvass of the market. It is somewhat significant that so far only the Pulo Laut coal, among the smaller sources of supply, has been able to gain a hold on the market, shipments from Kebao, Tourane, Batan, Tsingtau, Brooketon, Labuan, and other places so far having proved failures financially. The falling off in imports of Manchurian coal was due, to some extent at least, to troubles in China.

The exact tonnage taken by Canton from the Hongkong market is not known at this time but is reliably estimated at 170,000 tons, or about 18,000 tons less than in 1910. Shipments to other ports from Hongkong were less in 1911 than in 1910. (C. R.)

HAINAN:—During the past year work in the tin mines at No-doa, located a little northeast of the center of the island, has been commenced and is being prosecuted with some success, though the process of mining is crude. The ore is said to run about 60 per cent tin. The product is shipped from Hausui Bay, on the west coast of the island, in a small steamer belonging to the company and is cleared through the Kong-moon customs for Hongkong.

FORMOSA NEW COAL MINE.—In central Formosa a large deposit of coal has been found in the Nanto Prefecture. The quality is not very good, but accessibility and quantity are such as to encourage the development of a mine. Some time ago applications were filed with the Government for obtaining license to carry on mining in this Prefecture, but the Government was disinclined to allow operations because of the proximity of the deposit to the territory of the aborigines. Now that the lines against the savages have been advanced, the Government will grant the present application. The sugar companies of south and central Formosa, who now import coal from Japan, will be supplied from the new mine.

JAPAN:—Several Silesian spelter-smelting houses have recently received important orders from Japan for spelter sheets.

COAL DISCOVERY.—It is reported from Muroran, Japan, that a large vein of coal has been discovered some 60 miles from Sarufutso, Kitami Province, by a surveying party sent by the Mitsubishi Co. The coal field, it is stated, covers some 100,000,000 tsubo (tsubo =35,581 square feet).

SIBERIA NEW GOLD FIELDS.—According to information from the district geologist of the Yakutsk Province, large gold fields have been discovered along the Billiuin River, about 300 miles from the town of Billiusk, and in the sources of this river in the Yakutsk Province. Gold fields have also been discovered in the river systems of the Katrni and Biu Rivers in the Altai district.

SIBERIA—From information collected by the Amur Expedition the amount of gold (in troy ounces) handled by the various gold laboratories in Siberia in 1910 was as follows: Siberian Bank, Blagoveshtchensk, 330,545; Siberian Bank, Irkutsk, 10,730; Government laboratory, Blagoveshtchensk, 273,534; Government laboratory, Irkutsk, 175,785; Government laboratory, Nicolaevsk, 53,599; total, 844,193.

FORMOSA.—The Formosan Government has granted a license to three Japanese to exploit a copper mine said to have been discovered in Dai-Nanwo, Rato, Giran Prefecture.

GRAPHITE IN CHINA.—According to Consul Julean H. Arnold there is said to be much graphite in the vicinity of Amoy, and it is anticipated, when mining operations are commenced in that section of China, that the region will be able to supply a considerable quantity of graphite. Of just what quality or grade it will be the consul cannot say at the present time.

SIBERIA: A GOLD DEPOSIT of exceptional richness is rumored to have been recently discovered at the Luibavinsky mine, on the River Onon, about 200 miles from Chita. It is reported that there is more than I pound of gold to 1½ tons of gravel.

SIAM COAL SUPPLY.—Only brown coal or lignite has thus far been found in Siam. As imported coal is too expensive for fuel for manufacturing purposes, wood and paddy husk take its place, but the local supply of firewood does not seem to be sufficient, as $16,247 worth of wood was imported in 1911. The coal and coke imports for 1911 amounted to 13,613 tons, valued at $78,638, as against 24,178 tons, valued at $159,176, for the previous year. Of the coal and coke imports for 1911, the United Kingdom and dependencies supplied 7,758 tons, Borneo 1,631 tons, and Japan 4,224 tone.

TONGKAH HARBOUR.—The output for the Tongkah Harbour Tin Dredging Co. for the fortnight from March 17 to March 23 was 23 tons (386.40 piculs).

THE KANABOI TIN CO.—At the annual meeting of the Kanaboi Tin Co., Ltd., the accounts showed a profit of $6,859 to be set against a debit from 1910 of $7,984. A liberal depreciation was allowed and $29,000 had been paid off mortgage and loans. Only $5,000 now remained to be paid off.

TING KIT TIN MINES.—The prospectus is issued for private circulation of the Ting Kit tin mines, with a nominal capital of $500,000 in $10 shares, of which 40,000 only is offered for subscription.

The directors are A. B. Allen, J. W. Vander Stadt, and the secretaries McAlister and Co. The property to be acquired is 1,078 acres, adjoining the Middleton mine, Johore. The property is partly prospected and five acres yielded 4,000 piculs. The report of experts indicate that there is a large area of land containing tin. It is proposed to start with dredging plant and $50,000 is considered sufficient as working capital, $20,000 of this being put out by a syndicate, half cash and half subscribing shares.

Serendah Hydraulic.—The output of the mine for the year was piculs 1,476 which was sold at an average price $52.05 as against piculs 3,356 sold at an average of $45.80 per picul during the year 1910. 387,000 cubic yards of an average value of 38 of a catty per cubic yards were sluiced as against 562,400 cubic yards of an average value of ·60 of a catty per cubic yard for 1910. The average working cost per cubic yard was 88 cents in both 1910 and 1911.

The gross profit for the year was $49,421.14 and after allowing the sum of $3,987.43 depreciation on buildings, tools and plant, etc., there remains a nett profit of $45,433.71. A dividend of 5 per cent was declared.

Sungei Gau Tin.—Mr. G. A. Derrick, who presided at the third ordinary general meeting of shareholders in the Sungei Gau Tin Mining Co., in reviewing the work of the past year said that considering the small battery with which the company was working the results were not unsatisfactory. The lode they were working was a very poor one as the ore was heavily charged with pyrites so that he thought, all things considered, the result of the year's working might be looked upon as satisfactory, although they were not in a position at the moment to declare a dividend. After writing off one third of the preliminary expenses and making allowance for depreciation, the profit amounts to $2,780.78.

Royal Johore.—The report of the directors of the Royal Johore Tin Mining Co., Ltd., states that the amount of ore received during the year was 739 piculs against 920 piculs in the previous year. The falling off is explained by the Temanoh syndicate having ceased working. The net profit amounted to $6,534.79. The directors recommended a dividend of five per cent., directors' fees $1,000, and carry forward $47.29.

Selangor Coal.—The following appears in a report by Mr. Scrivenor, F.M.S. Geologist:—

During the year prospecting work by diamond drill, hand-boring tools and pits, has been carried on by Messrs. Osborne and Chappel, with Mr. Mungo Park as Resident Manager, on behalf of the Rawang (Federated Malay States) Coal Syndicate, Limited, of London. This has been followed with great interest in connection with my report on the coal-measures as a check on the accuracy of the limits mapped by means of the soil derived from the coal-measures and its difference from the soil formed from the older rocks. As far as can be judged at present, it appears that the area given was too restricted, since the soil from the older rocks, which form hilly ground, overlaps that of the coal-measures.

Mining in French Indo-China.—The hitherto existing mining legislation of French Indio-China has just been reformed and completed in a decree issued by M. Lebrun, Minister for the Colonies. The general tendency of this new legislation is to simplify the regulations at present in operation and to avoid the disputes to which the lack of precision of preceding legislative provisions gave rise. Thus the decree of 1897 distinguished three categories of mines, and the result was that in some cases three mining concessions were superposed and the three concessionaries disputed regarding the extent of their rights. The new project only maintains one kind of concession, this giving the right to exploit all mineral products comprised within its limits. It may be noted the one clause of the new decree forbids possession or exploitation of mines to foreigners, and forbids also the taking of direct or indirect interest in the exploitation of the colony's mines to certain classes of officials. Further, instead of effective occupation giving the right of priority for the acquisition of prospecting rights, this will henceforth be determined by the deposit of the application at the offices of the chief of the province.

Siberia.—In the basin of the Lamur, a small tributary of the Amur, gold fields were recently discovered which at first were sacretly worked by 300 Russians, Chinese, and Koreans. At present there are three gold prospecting parties on the fields representing various companies, who have reported further finds. A large number of gold finds have also been made on the right bank of the Lower Amur.

Mitsui Coal Interests.—Since its recent purchase of the Noborikawa coal mine in Hokkaido, the Mitsui firm has been making preparations to extend its mining operation in Hokkaido. The firm got the Railway Board to build a branch line to the colliery branching off from the Koede station on the Hokkaido railway for the transportation of the output, and the branch line has now been completed. The line was built under the conditions that the firm continue to work the colliery for the next ten years or to bring up its output to one million tons at an earlier or a later date. The firm is evidently bent on making the colliery a base for its coal mining enterprise in Hokkaido and is now carrying out its extension, the work of which is to be completed in about one year's time.

Mitsu Bishi's Enterprise in the Hokkaido.—The Mitsu Bishi Kaisha's enterprise in the Hokkaido has been brought prominently before the public notice since the firm has recently entered into an agreement for the accommodation for capital to the Oyubari coal mines, conditional to the sale of the output through the hands of the firm. The firm have also purchased over fifty coal mines in Teshio and Iburi province in Hokkaido and are now negotiating for the purchase of a large coal mine. On the successful conclusion of the purchase the firm will commence the working of the several mines. As the first step of the exploitation in Hokkaido the firm is reported to have decided to establish its branch office in Sapporo and Mr. Miyakegawa, at present the president of the Shanghai branch, will be transferred to the presidency of the new branch office. The future of the Mitsu Bishi's enterprise in the Hokkaido will be watched with considerable interest.

HAN YEH PING

Annual Meeting of Shareholders is Held At Offices of Company.—Three hundred and thirty shareholders of Han Yeh Ping Iron and Coal Co., Ld., attended on the 12th inst. at one o'clock an annual meeting held at its local head office No. 110 Bubbing Well Road, Shanghai. After the report of the company's work and financial standing of the past year read by Director Wang Tse-kyi the following new directors were elected by ballot:—Messrs. Chao Chu-chuan, Sheng Kun-pao, Yang Hang-cheng, Hu Pai-liang, Chu Pansan, Yuan Pai-kwei, Nieh Yuan-tai, Wong Tse-kyi and Shen Tung-ho. Messrs. Chu Tse-yau and Yang Yi-tse were appointed auditors.

Mr. Wang reported that the total income of the company last year ending 8th moon amounted to Tls. 6,034,618.95. Owing to the recent revolution and to the stoppage of railway construction in the country the company sustained a great loss of business, the preceding income being about Tls. 8,000,000. Mr. Wang proposed that the initial capital of $13,160,000 be increased to $30,000,000, by issuing additional shares of $50 value each. The proposition after some discussion was carried.

When the question of dividends was brought up before the shareholders many conflicting views were presented. It was decided, finally, that the usual 8 per cent. devidend be distributed in shares of the company thus leaving the cash reserve intact..

Pen-Hsi-Hu Mine Progress.—The steel enterprise undertaken as subsidiary work of the Pen-hsi-hu coal mine is said to be progressing favourably. The experts sent abroad have already concluded necessary investigations, and the Chinese capitalists have announced their readiness to pay in 300,000 dollars as the second instalment of their subscriptions toward the great foundry fund, the Chinese share of which amounts to two million dollars. The Okura firm also decided to meet the call for the second instalment. On the conclusion of the payment, the proceeds will be appropriated to the purchase of the necessary machinery and the work will be actually commenced. It is stated in this context that it is thought advisable to seek the market in China and Chosen for the output for the Penhsihu mine, and the company has decided to extend the market in the direction of Chosen, Shanghai, and Hongkong.

To Work Tayeh Mines.—The Bureau of Finance has proposed that two million taels will be given from the Government from to develop the mines of Tayeh district in co-operation with the people. The name of the company will be "Ta Hsin Kung Hsi, Limited." This proposal has been delivered to the Emergency Assembly for consideration.—Hankow Daily News.

Oil in Hokkaido.—It will be remembered that a few years ago the International Oil Company abandoned its enterprise in Japan, selling to Japanese at a considerable sacrifice its refineries in Echigo and its works in Hokkaido. The engineers of the Company had doubtless convinced themselves that to continue operations in Hokkaido would be simply to throw good money after bad, and they advised the speediest possible withdrawal from the unprofitable scene. The Japanese company which then came into possession of the works, went on boring here and there, and it is stated that at a place near Ishikari indicated by an eminent Japanese engineer, Professor Otsuka, a large source of oil has been tapped. This statement must be taken with reserve. On no subject has there been a greater disposition to exploit public credulity in Japan than on the subject of oil wells. There is an element of speculation in searching for this hidden treasure, and operators upon 'Change have often profited by skilfully circulated rumours. It is true that the International Company entered the Japanese field as much for the purpose of proving the non-existence of oil in these islands as for discovering it in quantity. But the Company had in its employment experts of the highest experience and knowledge, so that we hesitate to credit any statement impugning the soundness of their judgment. The newly-found well at Ishikari may turn out to be a very ephemeral affair.

Chosen Gold Mines.—Registered in London with capital of £74,400 in £5 shares, to acquire any mines, mining rights, and metalliferous land in Chosen (Korea), or elsewhere, and to adopt an agreement with the Korean Exploitation Syndicate. The signatories are: H. Collbran, Caxton House. Westminster, S.W.; M.P. Soyce, M.P., 3, Buckingham-gate, S.W.; E. T. McCarthy, 10-11, Austinfriars, E.C.; F. H. Rawson, 5, Whittington-avenue, E.C. (20 shares each); H. R. S. Aldon, Caxton House, Westminster, S.W.; F. P. Worsely, Caxton House, Westminster, S.W.; S. M. B. Aoki, Caxton House, Westminster, S.W. (one share each).

To Refine Zinc in Japan.—The refining of zinc is still a difficult problem for our mining engineers and has been almost abandoned as impossible. Repeated experiments by specialists have proved unsuccessful. The mineral, the production of which is yearly increasing, is accordingly exported aboard in

the raw state and reimported to this country after being refined. The reason the mineral cannot be refined here is the lack of the clay for the manufacture of necessary retorts. To analyse and refine zinc ores in Japan there must be imported the necessary raw material and, first remunerative, and it makes no difference, from a business point of view, whether the ores are exported and imported in the refined state. This accounts for the failure of repeated experiments. With the recent progress of electric industry in this country, it was attempted to refine zinc by the use of electricity process, but without success.

Mr. Nishimura, expert of the Mitsui Mining Company, who has recently returned from Europe, has invented, as the result of his researches and investigations while abroad, a method of producing a special kind of retort that will stand any heat. It is made from common clay, hardened by special process. The Mitsui Mining Company has decided to start a zinc refining business adopting the method invented by Mr. Nishimura and utilising the zinc ores produced at the Company's Kamioka mine. The factory will be established in Kyushu near the Miike colliery. The factory will be placed under superintendence of a foreign expert, and will be completed and ready for operation by next Spring.

The Menglembu Lode Syndicate Ltd., announces that all debts and the mortgage, which on Sept. 30, 1910, stood at a total of $110,000 would be completely paid off by the middle of May from which time the Company would enter on a dividend paying era.

The mine is splendidly equipped with lode mining machinery unequalled in Perak.

COMMERCIAL NOTES

Copra Trade.—The substitution of soya-bean oil for some purposes has caused some consternation among copra producers in the Philippines and the East Indies. The demand for copra and coconut oil is increasing so rapidly, however, that commercial circles in the Far East appear to regard any serious interference with the copra trade from such substitution as unlikely.

Philippine Cacao Culture.—A determined effort is being made to stimulate the production of cacao in the Philippines both for local consumption and for export to the United States. Cacao is now produced in partially all portions of the archipelago, but the production is small, apparently because of the time required for bringing the trees into bearing. The Filipinos use cacao freely when it can be had and understand its manufacture. About 2,000,000 pounds are imported annually, most of which is from the East Indies in crude form for manufacture in the Philippines. Three Spanish factories for the manufacture of chocolate and cocoa have long existed in Manila. The Government authorities in the islands believe that the cultivation of cacao would be profitable from an agricultural standpoint and would add to the industries of the islands as well.

Linalol Oil Extraction.—The Formosan Government has recently granted a license to the Mitsui Bussan Kaisha to engage in the production of linalol oil a by-product of a certain species of camphor trees, which abound in Formosa. The oil is highly valuable in preparing perfumes. It is found now principally in Mexico and Venezuela. The term granted to the Mitsui Bussan Kaisha will expire March 31, 1912, but it is expected that about 300 kilos will be produced during that period.

Fishing Industry.—The local government of the Pescadore Islands is planning to improve the fishing industry. It intends to buy a steamboat equipped with an oil engine. The Pescadore Islands is the seat of Japan's southernmost naval station.

Caviar Prices.—According to information from Nicolaevsk, the prices on Keta and salmon caviar are gradually increasing, $1.10 to $1.15 per pood (36.112 pounds) being offered for Keta and $6 to $7 for salmon caviar during the latter part of November, as against 90 to 95 cents and $4 to $4.75, respectively, a month previous.

PHILIPPINE MINING NOTES

Luzon Gold Company:—Sluicing is expected to commence in June on the properties of the Luzon Gold Company. The first work to be undertaken will be the sluicing of some bench claims, and a large number of native laborers will be required for this purpose. The laborers will be recruited in Nueva Ecija and proceed overland to the mining properties on the Umirai river. Water will have to be carried from the river over a distance of about 1500 feet, and for this purpose 2000 feet of miners' hose have been ordered from the United States.

This property is but a small part of a vast section including hydraulic, dredging and sluicing ground which has been acquired by the Luzon Gold Company. The company has vast placer holdings in a district hitherto undeveloped, partly situated in Tayabas, province and extending into Nueva Ecija and the headwaters of the Umirai river which empties into Dingalan bay about 100 miles north of Atimonan on the Pacific coast.

The Umirai river is the same river on which is situated the property for whose development the Squires brothers recently made arrangements with Australian capital for the placing of a dredge. The Squires property is located on the lower part of the river.

Headwaters Mines:—Operations have been resumed in the Headwaters Mines district to the northwest of Baguio.

Smith, Bell and Company have taken over the project. All encumbrances of the mine were cleared away by the payment of P50,000 to L. O. Hibbard, who was appointed receiver when the Hongkong capitalists abandoned the property. Engineers who have since investigated the lead of the Headwaters mine declared that it is a valuable property.

New Dredge Ordered:—The new dredge for the Squires gold mining property on the Umarai river has been ordered from Melbourne and will arrive during the present year. The dredge will be all steel and will have steel pontoons. It is of new pattern, the chain elevator having been abolished, and instead the buckets are fastened to what resembles a huge water mill wheel. The dredge complete, including steel pontoons, will cost £20,000, delivery at factory. The purchase of this modern dredge is a result of the recent investment of Australian capital to the extent of £50,000 in the Squires property.

O. K. Mining Company:—Articles of incorporation were filed in April with the government by the O. K. Mining Company, a corporation having its head offices in Baguio The company has a mining property in the Benguet mountains, which the articles of incorporation state will be developed by either the lode or placer methods.

The directors and incorporators of the new mining company are John L. Fraser, J. F. Tessar, A. W. Simmons, J. J. Murphy and Harry H. Herbert. Mr. Herbert has been elected treasurer of the company. The capital stock amounts to P26,000, divided into shares valued at 1.00 each. Of this stock issue P12,000 has actually been subscribed and paid up. Subscriptions certified to by the treasurer are as follows:—

John L. Fraser, P5,454, J. F. Tessar, P1,091, L. W. Anderson, P1,091, A. W. Simmons, P1,091, Pilar Palacios, P ,091, J. J. Murphy, P1,091, and Harry H. Herbert, P1,091. The organization of the O. K. Mining Company was effected at a meeting held in Baguio on March 4.

Batan Coal Report.—The U.S. government bureau of mines coal testing plant of Pittsburg, Pa., has reported on the fifty-ton sample of East Batan coal sent by E R. Hix, coal expert of the insular government.

It says that Batan coal evaporates but 20% less water than the best grades of Japanese and 30% less than the best grades of Australian coal.

The coal when received by the bureau of mines contained 60% of slack 15% of lump and 25% of small lump, which greatly reduced the steaming value of the sample. The average run of mine coal contains about 60% lump, large and small, and a certain per centage of nut coal, reducing the less valuable slack to an unimportant percentage.

The report further states that even in the condition in which it was received, the Batan coal equalled in steaming qualities the best grade of Labuan (Borneo) coal, which is mined and shipped in great quantities.

An exhaustive report recently made on Batan coal by Mr. Hix says that basing the steaming value of the coal on the figures available, which do not represent the actual value of the coal, it is worth P7.20 per ton laid down in Manila, and that it can be laid down here at a cost of P4.00 per ton.

The nine can be made to produbе 5,000 tons of coal monthly.

There are many coal properties in the islands which are awaiting the development of the Batan mine before doing extensive development work on their own account, and it is very probable that the industry will be given a boost by the report received from the United States bureau of mines.

Tayabas Oil Fields; P.I.—The department of the interior, has approved the making of a topographic survey of the Tayabas peninsula, where are located several hundred petroleum placer claims. A small amount of development work has been done in this district to determine the presence of oil in paying quantities, but before work of a serious nature can be done a topographic and geological survey is desirable.

The bureau of lands has been directed to proceed with the triangulation and topographic survey, the maps of which, upon completion, will be turned over to the geologists of the bureau of science. A preliminary reconnaissance of the peninsula will be completed by the bureau of lands before the rainy season. The area to be covered by the topographic map lies south of a line between the towns of Catanauan and Peris, and contains approximately 4,000 square kilometers. Upon the termination of the preliminary reconnaissance of the peninsula the triangulation and topographic parties of the bureau of lands will go into the field and complete the work before the next succeeding rainy season.

Philippine Co's New Dredge:—The machinery for a five and a half foot close connected gold dredge built by the New York Engineering Company, measuring up some seven hundred tons has arrived in Manila for the Philippine Exploration Co.

The company has been engaged for some months past in the construction of the hull of the dredge. It is now nearing completion and will be launched the end of April.

CEMENT NOTES

STRAITS SETTLEMENTS.—Imports of cement into the Straits Settlements for the year 1909. No later statistics are available:

Countries.	Casks.	Value. Gold.
United Kingdom	223,856	$539,089
Burma	10	51
Hongkong	34,223	88,508
Johore	3	10
Perak	10	28
Selangor	70	227
Austria-Hungary	17,253	40,316
Belgium	1,747	3,879
Denmark	8,000	18,034
Germany	5 196	13,425
Netherlands	1,000	2,386
Bussia	3,000	5,964
French India	40	85
French Indo-China	421	854
Japan	5	11
Total	294,834	712,867

PHILIPPINE ISLANDS.—Apparently Hongkong has regained its hold upon the cement trade of the Philippines at the expense of American cement exporters. The imports of cement into the islands in the fiscal year 1911 show a large increase in the total receipts, but a decided decrease in cargoes from the United States.

The enactment of the tariff law which admitted American cement free of duty into the islands was followed by a gain in imports of American cement. The imports of cement into the Philippines for commercial, as distinct from governmental, purposes were 28,418 metric tons, valued at $331,143 in 1908, the United States having no part whatever in the trade. In 1909 the imports were 25,040 metric tons, valued at $247,425, of which the United States supplied less than $300 worth. In 1910 the commercial imports were valued at $416,815 and included 42,776 metric tons, of which 9,227 tons, valued at $103,078, were from the United States.

This increase in the total imports was more apparent than real, for the reason that the fiscal year 1910 was the first year in which imports of cement for governmental use were included in the commercial import figures.

TRADE FLUCTUATIONS—INCREASING USE OF CEMENT.—The increase from the United States, however, was real and represented an effort on the part of American exporters to get trade that theretofore had been largely in control of the Hongkong cement manufacturers in competition with the cement factory at Haifong, in Indo-China, and a Chinese Government-aided factory near Canton. In the fiscal year 1911 the total imports of cement into the islands amounted to 55,480 metric tons, valued at $526,456, an increase of 12,704 metric tons, valued at $109,641. The purchases from the United States, however, reached a value of only $71,436 as compared with $103,078 the year before, while imports from other countries increased from $313,737 to $455,020. While some small shipments continue to come from Germany, Belgium, China, and other countries, the greater portion of the trade in the islands is now divided between the Hongkong concern and the Indo-China factory, Hongkong having much the larger portion.

In connection with the figures of the fiscal year 1911, which show a large general advance in imports of cement over previous years, it is noted that, while most of the increase is due to the building of bridges, municipal and other structures, and various public docks and similar works, there has been a notable increase in sales of cement to Filipinos for general purposes. The use of concrete by Filipinos and Chinese in the islands is greatly on the increase. Even in nipa houses the posts are being placed in concrete foundations nowadays. It is likely, therefore, that trade in the future will continue to expand rapidly. (C. R.)

BURMA.—Cement is used to a considerable extent in Burma. Modern steel-framed buildings having brick walls with cement facings are now being erected in Rangoon. The public Works Department of the Government of Burma employs a great deal of cement in the construction of public buildings, bridge work, etc. The Rangoon Port Trust is engaged in the construction of a large training wall, for which much cement will be needed during the next five years.

The imports of cement into Burma during 1910 were as follows:

Countries.	Cwt.	Value.
Great Britain	222,500	$145,439
Hongkong	57,822	36,625
Belgium	20,413	11,548
Austria-Hungary	12,895	7,487
France	3,032	1,904
All other	2,123	1,497
Total	318,785	204,500

SIAM.—Concrete construction is extensively employed by the Siamese Public Works Department and private concerns for foundations of large public buildings, walls of canal locks and sewers, in the construction of bridges, and for many other purposes, but the cement needed is not manufactured locally, although abundant material for its production is found not far from Bangkok. The customs returns show a steady increase in the amount of cement imported yearly, the receipts for the fiscal years 1907-8, 1908-9, and for 1909-10 having been valued at $158,273, $140,069, and $223,428, respectively.

The imports of cement by countries for the above periods are shown in the following statement: (C. R.)

Countries.	1907-8	1908-9	1909-10
	Tons.	*Tons.*	*Tons.*
Singapore	86.02	253.16	52.11
Hongkong	454.05	2,475 04	3,894.18
United Kingdom	1,292.01	687.12	1,350.06
Ge many	3,241.12	3,032 14	3,507.06
Denmark	5,6 7.09	3,960 00	8,411.07
Bel ium	231.13	1,523.09	1,427.14
Cochin China	....	933.02	2,116.14
Other countries	224.69	668.53	590.03
Total	11,206.11	13,532.10	21,378.06

GREEN ISLAND CEMENT COMPANY.—Some interesting information on the cement industry of the Far East was made public in the speech of Mr. C. A. Tomes before the annual meeting of the Green Island Cement Company held at Hongkong on April 23rd, ulto., and from which we extract the following:—

At the different works of the Company nothing very eventful has occurred during the year. In the spring Hok Un worked half time only, owing to the slackness of demand, but as the year wore on the output was gradually increased until in August and September everything was going at its fullest power and a market was found at covering rates for all the cement that could be made, and this continued until the end of the year and later to February this year when, for the purpose of relining, some of the Aalberg kilns were closed. These we shall except to start again within a month or two, although in these disturbed times we shall not pretend to make any accurate forecast of the work ahead of us.

The Macao Works were kept steadily and fully going all the year on clay preparing and drying; and four out of the five kilns have been kept burning (it is usual to hold one in reserve) from September on to the present time. Deep Water Bay was on half capacity for half the year and ran full time for the remainder.

The quality of the cement has been maintained at the highest degree and there have been no rejections for quality anywhere.

Competition continues unabated but has somewhat changed its form. European shipments have decreased to the Far East and in the main can be ignored. The establishment of new factories in near by territory is what interferers with us most, and some of these are gradually improving the quality of their manufacture and increasing their output. There are probably more factories in the East than the average man realizes, for besides the numerous Japanese establishments, including Manchurian, we have those at Tongshan (Tientsin), in Hupeh, on the Yangteze, at Haiphong, at Kuala Lumpur, and a new one at Pakang in Sumatra, and there may some day be one in Manila. To put against the rise of these establishments we have the undoubtedly ever-increasing ca.l for cement. And if this increase continues in years of stagnation and troubled trade such as we have experienced lately, what may it be when China settles to a steady course and the inevitable railway building comes into full swing?

The cement industry the world over is far from being an even and steady-going business. It has had great vicissitudes in England, and after the depressing times in that country of two or three years ago the shares in the largest organisation there have risen to ten times their previous lowest quotation—that is the common shares—a fluctuation beyond anything we have ever seen. In America in the past twelve months, the largest company, and the largest single company in the world, fell upon evil times and had to be reorganised from the bottom, competition became unparallelled and prices cut so low that the highest grade cement was selling at the works, luckily for us at interior points, a 45 gold cents per barrel in bulk, *i.e.* without counting the cost of the barrel.

I have mainly dwelt so far upon the consuming side of our product. A word now on, perhaps, a more important factor, the supply of raw material. Limestone causes us as much anxiety as ever, for though the Canton authorities stand at the moment no longer in our way as rival buyers or promoters of difficulties for us, through the disturbed state of the delta and the consequent piracy the stone contractors find increasing trouble in securing boats and in getting them through to Hongkong. The supply of wood for casks is suffering from the same disability, and unless we can soon feel assured of a quick cessation of these hindrances we may come face to face with a serious situation. We have sufficient contracts for stone and dealers are eager to sell at a price, but we shall be more relieved when we see the stone arriving in much larger quantities than is now the case.

BUILDINGS

(*Continued from page 26*)

The new building will be of steel frame, not less than four storys high, with elevators and will be the most modern and up-to-date building in the city when completed.

This property has a frontage of 100 feet on the Escolta and extends to the Pasig River and contains over 1,800 meters. The purchase price was P.200,000.

NEW ILOILO HOTEL.—A company has been organized to operate a modern hotel in Iloilo, construction on which will be begun within the next three months.

The capital stock is P.300,000, divided into 3,000 shares at a par value of P.100 each.

An area comprising 6000 meters of land has been purchased. The building will contain 60 rooms and be of concrete throughout and equipped with all modern conveniences.

The officers of the company are; Antonio E. Barretto, President; Ruperto Montinola,

Vice-President; and A. J. de Souza secretary-treasurer. Other directors are: Esteban de la Rama, Espiridion Guanco, E. E. Calvin, D. M. Stewart, Juan de Leon, Juan Mencarini, and Celso Ledesma.

Mr. A. J. de Souza will leave for Cebu next week for the purpose of organizing a similar company to operate a modern hotel in that city also.

New Warehouse, Cebu.—The new concrete warehouse of the Pacific Commercial Company on the waterfront front is rapidly nearing completion. It is rumored that other firms are planning similar work in the same locality.

Provincial Buildings.—On a centralized location in Cabanatuan, the capital city of Nueva Ecija, that province is now building permanent government buildings of reinforced concrete, not only for all offices for provincial officials, but for housing the Cabanatuan public school and the provincial high school.

A plan drawn up by Consulting Architect William E. Parsons, places the six buildings required, an athletic field, a public plaza, six tennis courts, and a park on a site measuring 410 by 400 meter. This centralization of government buildings in provincial capitals with school facilities on one beautiful site has also been done at Santa Cruz, La Laguna province, where permanent concrete structures were erected. A simalar plan was followed out in Malolos, Pampanga, although the buildings are not constructed of permanent material.

It is estimated by the provincial division of the bureau of public works that the whole construction can be completed for P.135,000, The work is being done under contract by John Gordon. Plan 10, of the bureau of education, has been adopted for the central school, providing a building of ten rooms for the children of the town, at a cost of P.20,000

New McCullough Buildings.—The Three buildings that house the big establishment of E. C. McCullough and company were opened on April 1.

In the front end of the P.60,000 concrete building is a full line of stationary supplies and books. In the rear the offices. The building is two stories high. The second floor is used for bicycle, automobile sundries, typewriter and other supplies. The building is ventilated by the new system of the American Bloner Co., through vents in the floor, through which air is forced by a fan attached to a twelve horsepower motor.

The three buildings, which adjoin one another, have a total floor area of 90,000 square feet. One of the buildings is used as a warehouse and automobile showroom. The third building, which is back of the concrete building and faces on the river, is used as a supply dept for paper and stationary.

The second floor of the building holds the printing shop, probably one of the best equipped in the Orient. There are several job presses and monotypes and the normal force of men at work numbers 200.

New Factory Buildings:—The Manila Refining Company will construct four reinforced concrete factory buildings, one for the manufacture of candles, another for the manufacture of fertilizers, one for refining, and the fourth for a store house at a cost of approximately 40,000 pesos. Work on their construction will begin as soon as the work of driving piles for the foundation is finished. The contract for the construction has been let to W. A. Crossland and J. Hickman, who expect to finish the work in six month.

The Manila Refining Company, has for several years been located near Caloocan, where they have been turning out a product of very high grade candles and fertilizers.

Delmar Smith Clinton has been awarded the contract for constructing the new Malate school, his bid being P74,465.

A meeting of stockholders of the Army and Navy Club, Manila, was recently held for the purpose of discussing the advisability of an appropriation of P60,000 for an extension to the present club building in the new port district.

Manila.—Bids were opened on April 20th, for the construction of two reinforced concrete apartment houses for the Manila improvement company. These new apartments are to be an innovation in the way of buildings for Manila, each building having four distinct apartments, built much as in the United States. They are to be started immediately on the corner of Divisoria and Dakota; Ermita.

The following bids were opened and taken under advisement:

Calvin and Loper, P37,850; time 140 days.
John H. Murphy, P53,720; time 145 days.
W. W. Colman, P39,700; time 120 days.
M. Manade, P43,200; time 150 days.
O. F. Campbell, P45,875; time 6 months.
Delmar Smith Clinton, P55,300; time 6 months.
J. W. Odom, P36,698; time 120 days.

A *new theater* is to be built in Vladivostock by the Clerks' Club.

Proposed Rubber Exposition in Java.—Consul B. S. Rairden, of Batavia, Java, has been notified by the Director of Agriculture of the colony that an International Rubber Exhibition will be held in Batavia during the first half of the year 1914, under the patronage of his excellency the governor general. The exact date has not yet been decided.

Rebuilding of Hankow.—Mr. Percy Tilley, a Shanghai architect, has gone to Hankow to assist in the drafting of plans for the rebuilding of the burned district into a modern model city. Since the political upheaval at Wuchang, and the subsequent burning of the native city of Hankow, that part of China, once the commercial center of the interior, has been reduced to ruins and deserted. As Hankow is not likely to be exposed by renewal of hostilities, the board of industry of the Wuchang provisional government, President Sun Yat Sen, and the Chinese merchants of Hankow, notably Messers. Chang Chan, Wu Pay Ling, and Sun Wei Chung, have formulated elaborate plans to transform the deserted city of Hankow into a commercial seat.

A new bund, with lofty buildings, wharves, broad roads, and other commercial facilities, will be the principal feature of the reconstruction. Thirty-four roads will be laid out. The landowners will contribute 10 per cent of their acreage for these highways and for sites for public buildings and parks. The landowners have been instructed to establish their claims to their respective holdings in the burned area, and new title deeds will be issued.

The Commercial Building Corporation will float a loan of 15,000,000 taels $9,200,000), guaranteed by the Republican Government, it is said, and this will provide for the erection of 30,000 houses.

An appropriation of $50,000 will be asked for at the coming session of the Imperial Diet for establishing an industrial school in Taihoku. The school is intended by the Formosan Government to be devoted almost exclusively to manual training of the native Formosan (Chinese).

A new agricultural high school will soon be established in Blagovieshtchensk.

Exposition in Siberia.—Expositions are not new in eastern Siberia, several having been held, the last in 1899 at Khabarofsk, on the Amur River. In order to call attention to the country's progress and show the development of the Russian Far East since then, the local authorities have decided to hold another in 1913, which will also celebrate the three hundredth anniversary of the Romanoff reign in Russia. It will be held during August and September, as the Priamur Region Exposition of 1913, at Khabarofsk, the capital of Priamur district.

Special buildings will be erected, and permits for space for exhibits will be granted on application. Gold, silver, and bronze medals, as well as diplomas and money prizes, will be granted to exhibitors.

Steel Godowns.—The Standard Oil Co., of New York, has under consideration the erection at the east of Dairen Wharves of one all-steel godown, the same as that already erected, having the dimensions of 200 ft in length, 80 ft in width, and 20 ft in height.

HARBOUR WORKS

Hulutao Harbor Works.—Official reports indicate that the new harbor works at Hulutao, Manchuria, are progressing favorably. The railway to the harbor from the Peking-Mukden Railway line at Lien-shan is about complete and will greatly facilitate the work. The new harbor will be protected from the sea by a breakwater over a mile long, which can later be extended more than a mile farther. Plans for the portion of the harbour which is to be completed at once provide for the accommodati n of 12 large vessels. The depth of water in the harbor limits varies from 18 to 30 feet at low tide. The work will take about six years and involves the expenditure of about $5,000,000 gold.

Chemulpo Dredger.—The 800-ton steel dredger purchased in Germany through the Mitsui Co. for $125,000, by the Chemulpo customs authorities, has arrived. It has a propeller on both sides, each of which is moved by four steam boilers. The propellers and a sand pump are put in motion simultaneously, so that the vessel, while steaming, may pump up sand and mud. The suction pump has power to suck up sand lying 30 feet below the vessel. In a quarter of an hour the vessel can remove about 1,000 tons of sand and mud.

Singapore New Harbour Scheme.—The construction of an unbroken sea wall from Johnston's Pier to Tanjong Pagar in the Singapore Harbor has been abandoned. Until recently the work was rapidly proceeding at both ends, but when the walls had been brought to within 1,000 feet of each other it was found impossible to make the sections meet on account of lack of foundation for structural work. Accordingly, the present gap in the wall will be used as an entrance for a new inner harbor, which will provide a fairway measuring 880 feet across, and will be about 20 acres in extent. It is intended that this harbor be used for small craft. This change of plan completely upsets the Government's scheme of reclamation.

Java.—The artificial harbor of Tanjong Priok, the port of Batavia, excavated and constructed some years ago at great cost, is proving inadequate and is to be doubled in extent. Many new buildings have been erected or are in course of erection in the commercial part of Batavia.

Sourabaya, the chief commercial city, is having a new dock and harbor and quite a building boom is taking place; large numbers of new warehouses, banks, and residences are in course of construction. In Samarang also the same change is taking place.

Harbour Works at Sourabaya.—It is estimated that the harbour works at Sourabaya, which includes the establishment of a floating dock, will cost 14,000,000 gulden. On the conclusion of the operations it is calculated that the harbour will have some five miles of quays. The growth of this port may be realised when it is stated that the entrances and clearances increased from 2,300,000 tons in 1900 to 4,208,000 tons in 1909.

A harbour for lighters is being built as Samarang, as well as various new railway stations, and the total cost is estimate at 2,400,000 gulden.

At Tandjong Priok quays are being lengthened, the harbor deepened, and a new dock built; a new up to date railway

station is also being erected. The cost of the work is estimated at 4,000,000 gulden.

Harbour works at Macassar include the lengthening of quays and the construction of offices and warehouses. The cost is estimated at 2,225,000 gulden.

Tokio Harbour.—A new programme of harbour construction for Tokio has been completed and is now in the hands of the Chief of the River and Harbour Department of the Tokio Municipality. According to the new scheme, says the "Japan Herald" the mouth of the Sumida River is to be included within the harbour limits to facilitate connexion between the harbour and the rivers and creeks in the city. The work is estimated to be completed in twelve years, and the expenditure is estimated at Y. 37,000,000. Work is to be divided into two periods, the first term covering eight years. During the first term the harbour construction programme is to be almost completed and in the second term the construction of docks, reclamation of foreshore and dredging work is to be carried out. The actual amount of capital required is expected to be about Y. 12,000,000 to Y. 13,000,000, as about seventy-four per cent. of the total expenditure may be covered by the sale of reclaimed ground.

Bais Port Improvements.—£ 7,000 has also been allotted to the bureau to complete the port works at Bais. Oriental Negros, making the total cost of the port improvements there £ 67,000. This work is being done by contract by A. E. Ainsworth and rapidly nearing completion. The port of Bais taps a big sugar producing section in Oriental Negros. A causeway is being built from the mainland to the small island of Daco, where a wharf and sugar shed for storing the sugar as it is brought down for shipment are being constructed.

Zamboanga Port Works.—Provincial Engineer Stirling, is completing the plans for the new fill and wharf. Bids will be advertised for shortly.

Pearl Harbour.—By midsummer or early autumn it is expected that the work of constructing the approaches to Pearl Harbour will be completed, and then the United States will have in the Pacific a national defence as important and as impregnable as that of Great Britain at Gibraltar. When completed, the work will have cost about $10,000,000. The channel leading into the harbour already has been cut to a depth of thirty feet below low tide, and thus will pass some of the cruisers of the Pacific station. But the cutting is to continue until there will be enough water to float the greatest of the Dreadnoughts.

Pearl Harbour is to be the most strongly fortified naval base in the Pacific, if not in the whole world. The harbour is land-locked. When the channels to the east, the middle and the west locks have been dredged, the harbour will be large enough to float the combined navies of the world. The work of construction has been under way for more than twelve years, and it was hastened materially after the Spanish War and the occupation by the United States of the Philippine Islands.

Hidden forts and disappearing guns of the latest pattern are to protect the new harbour. The guns will use smokeless powder so as to render their discovery by an enemy more unlikely than otherwise would be the case.

The Keihin Canal.—The Keihin Canal Company has for its primary object the excavation of a canal between Tokyo and Yokohama with a view, on the one hand, to the removal of inconvenience arising from the suspension of shipping services hitherto often experienced, due to the dangers attendant on navigation, and, on the other, the promotion of economic interests by the quick transport of goods between the two cities at a comparatively low cost. For convenience the scheme is spread over two terms. In the first term the Company has decided to appropriate five million *yen* for the construction of a canal between Haneda in the suburbs of Tokyo and Machida in Kanagawa prefecture, of a depth of 40 to 84 feet and a width of 114 to 132 feet.

It is estimated that some ninety per cent. of the gross tonnage of goods between Tokyo and Yokohama is transported by water. Assuming the greater part of those freights to be conveyed through the canal, the Company is confident that the profits arising from the enterprise will be by no mean small, even if the freight rates be reduced to a minimum, in view of the income accruable from attendant business, such as warehouses along the canal, etc. Under these circumstances there are reasons to believe that it will not be long after the completion of the canal, before the Company is able to declare a dividend of at least ten per cent.

Harbour Works in the Hokkaido.—H. M. Vice-Consul at Hakodate (Mr. E. L. S. Gordon) has furnished the following information regarding harbour works in the Hokkaido:—

Otaru.—A beginning is to be made this financial year (1912) with the second portion of the Otaru Harbour scheme, which consists of the reclamation of the foreshore between Wakatakecho and Minato Machi, some six acres in extent, and the construction of a pier. The Kumausu tunnel will be done away with as part of the Otaru Municipality Harbour scheme, thereby improving the communication between Otaru and Hariusu.

Hakodate.—It is reported that the passenger pier is to be widened to twice its present width, and nearly one acre of land reclaimed between the pier and the station for the handling of cargo. The Governor-General of the Hokkaido has assented to the commencement this financial year of the widening of the pier and the reclamation of nearly half an acre of land. In addition to the above, a line is to be laid along the pier, and good sidings on the sea front of the station.

Muroran.—It is expected that 9 per cent. of the reclamation work on the west side of the harbour, which was begun last year, will be finished this financial year, and the whole work completed next year. An area of 1⅓ acres will be set apart for timber. Railway lines are to be laid along the sea front as at Otaru and Hakodate.

Dairen Harbour Works.—The east quay of Dairen wharves, 1,450 feet long, and the east breakwater projecting therefrom have been completed, and the quay has 30 feet of water. A signal station is being constructed close to the lighthouse. The reconstruction of the main (west) quay into a vertical facing in concrete will be accomplished by the spring of 1913. Then the east side of west quay will be reconstructed.

The berthing capacity of the quay line is 5 steamers of 10,000 tons each, 4 more of 6,000 to 8,000 tons each, 3 of 4,000 tons each, and 10 others of 100 tons up to 3,000 tons each, making the total of 22 vessels at a time. So for the cargo-working record for a single day consisted in loading 9,584 tons general cargo and 2,400 tons of coal and discharging 3,293 tons of general cargo.

With the extension of the quay line, including new berths for steamers of larger type and the improvement of cargo-working equipments, the daily average of 10,000 tons for cargo work lies within easy reach, if only the goods to be loaded into steamers are conveniently placed and the manœuvering of vessels is conducted properly.

New Port Sakhalin.—According to information from Sakhalin, English capitalists intend to build a port on that island, and for this purpose it is planned to form a Russian stock company.

Kuala Kabu F.M.S. Messrs. D. G. Robertson, Ltd., have got the contract for the supply and erection of the engine and dredging plant for the Kuala Kubu river. The plant is expected to be in working order before the end of April.

New U. S. Coaling Station.—It is reported from Washington that a new coaling station is about to be established at Kiska Island, the most westerly of the Aleutian group. This news comes following the announcement that the coaling station at Sitka is to abandoned. The new station is a thousand miles nearer Japan than is Honolulu.

New Drydock Near Osaka.—Negotiations are in progress for the acquisition by the Kawasaki Dockyard Company of 100,000 tsubo of land at Amagasaki, near Osaka, for the construction of a large dry dock.

WATERWORKS, IRRIGATION

Bangkok Waterworks.—Steady progress is being maintained with the work Messrs. Howarth Erskine, Ltd., have in hand paving the way for Bangkok's water supply. About four kilometres of the smaller pipes have now been put down in the Dusit and Samsen districts, and the laying of the main pipe, 700 millimetres in diameter, has been started at Samsen. The construction of the filter buildings has also recently been commenced.

Tenders were opened in April for the construction of a filtered water reservoir and settling tanks, and were as follows:—

Filtered Water Reservoir.

	Tender Tcs.	Time of Completing
A. Scanzoni	102,200	10 months
Howarth Erskine, Ltd.,	138,500	12 ,,
G. Kluzer	140,200	12 ,,
Bangkok Dock Co.	143,850	14 ,,
Brossard and Mopin	200,000	18 ,,

Settling Tanks.

	Tender Tcs.	Time of Completing
A. Scanzoni	79,400	10 months
Howarth Erskine, Ltd.,	95,800	12 ,,
G. Kluzer	101,000	12 ,,
Bangkok Dock Co.	105,050	14 ,,
Brossard and Mopin	140,000	18 ,,

Messrs. Brossard and Mopin tendered only for the complete work at Tcs. 340,000.

Vladivostok Waterworks:—About two years ago a representative of a New York firm tendered for waterworks and electric tramway contracts and concessions in Vladivostok. The negotiations were not successful, owing to strong opposition to the proposals and to the fact that the term of office of the old town council was about to end. The council elected in 1910 was not in office long enough to negotiate these undertakings, as the election was cancelled and a new one ordered. The council of 1910 decided the contract for the tram line on the main street, which contract was given to local capitalists.

Now a new council has taken office and it is a proper time to reopen negotiations for the waterworks and the second system of trams. There will probably be an expenditure of $2,500,000 to $3,000,000 for waterworks. A plan which includes piping water to the city for about 25 miles has been worked out by a Swedish engineer and will probably be placed before contractors. Preparations for negotiations are being made. It is probable that $500,000 will soon be expended in extending the tram line system.

Waterworks for Pescadores.—The Government of Formosa is planning to construct waterworks in Boko of the Pescadores. The islands have a poor supply of water. The naval station is located at Bolo.

India, Irrigating Canals.—One result of the re-partition of Bengal will be to leave the new Presidency of Bengal with two large irrigation canals which do not pay. These are the Midnapore and the Hijili tidal canals. According to the canal revenue report for the triennial period ended March 31, 1911, the capital outlay on the Midnapore Canal was $2,832,326, the average annual receipts for three years were $64,783, and the average annual expenditure $72,270; the Hijili Canal cost $871,439, the annual maintenance charge was $20,350, and the receipts $18,350. The Sone and the Orissa Canals, which go to the new Province, are productive works in the true sense of the term, as they yielded an average annual profit of $583,320 during the last three years.

India, Upper Jhelum Canal Works:—Good progress is being made with the Upper Jhelum Canal, which, begun more than seven years ago, is one of the three sections of the great triple canal project being carried out in the Punjab. The main purpose is to enable the Upper Chenab and Lower Bori Doab Canals to supply water in the winter months to a large tract of arid country in the Sialkot, Gujranwala, Lahore, Multan, and Montgomery districts. The canal will also incidentally irrigate some 300,000 acres in the Gujerat district.

The canal which has a length of 88 miles, takes off from the left bank of the Jhelum at Fort Mangla, the point where the river emerges from the Himalayas. The path of the canal has to be cut through the lower hills to a depth of over 100 feet. As it crosses the natural watershed of the outer Himalayas and cuts through the northern slopes of the low hills known as the Gujeral Pabbis, it encounters numerous torrents with sandy beds and deep slopes. During the greater part of the year the beds are dry, but during the monsoon they are filled with raging masses of water. This feature of the country has necessitated high embankments, deep cuts, and many large drainage works. On the southern slopes of the Pabbis the torrents are deltaic in formation. It is calculated that the total discharge of all the torrents if they flowed simultaneously would be about 614,000 cubic feet a second, but fortunately they are not in flood together, and usually each is in flood only for a few hours at a time.

The 3 miles of cutting at the headworks at Mangla is the heaviest part of the undertaking, and excavations are carried on night and day. A light tramway being found inadequate, a broad-gauge plant is being put down, with 6 steam navvies, a like number of tank engines, between 300 and 400 tip-wagons of 15 cubic yards capacity, 15 miles of broad-gauge track, and about forty 1,000-candlepower lamps, with telephonic and telegraphic plant. Work has been in progress on the cutting since the beginning of last year, and since January there have been continuous night and day shifts. Apart from this cutting, which will not be finished until the autumn of next year, the channel excavations will aggregate a total of 780,000,000 cubic feet. Most of it is in light soil, and consists of deep cuts with long embankments, necessitating the employment of many miles of tramway track, the lead out frequently being as much as three-quarters of a mile long. These long embankments could not be safely erected until the works required to pass the torrent discharges had been constructed. The cost of the channel excavations alone is estimated at £440,000 ($2,141,260).

Siberia, Drainage Machinery.—At the request of the governor general of the Priamur district, the Department of Domains has appointed Engineer Stakle, chief of the hydrotechnical branch of the Amur Expedition, to visit the United States to observe the latest American methods of reclaiming swamps and the machinery and outfits used for this purpose.

Swatow Waterworks:—During 1910 work was started on the local waterworks system. Leigh and Orange, of Hongkong, are the consulting engineers for the buildings, and MacDonald & Co., also of Hongkong, are the contracting engineers. The water will be taken from the River Han about 10 miles above Swatow. The pumping and filtering plant will be at the intake and will consist of four settling tanks, each of 1,200,000 gallons capacity, four filter beds, each of 260,000 gallons capacity one covered-in service reservoir of 800,000 gallons capacity, and the engines, boilers, and pumps. The main from the intake station to Swatow will be a 12-in. cast-iron pipe, about 6¼ miles long, and the quantity of water delivered at Swatow 3.33 cubic feet per second. At Swatow will be a water tower from which the street mains will be supplied. The cost of the work is estimated at $325,500 gold.

Work Begun on the Cauvery River Dam, India.—Work has practically begun on the Cauvery River Dam about 9 miles above Seringapatam. This dam is to keep up the flow of water in seasons of deficient rainfall and to irrigate an enormous tract of land now lying uncultivated between the French Rocks and Chennapatna. It is estimated that 10,000 coolies will be employed. The enterprise is to be carried out departmentally.

The headquarters' establishment will be on the site of the dam, the superintending force consisting of a superintending engineer, three executive engineers, and seven assistant engineers. Comfortable residences and offices will be built on the spot for this force of engineers and other officials connected with the work. Cottages will be erected for the accommodation of the laborers and will be under strict sanitary control. There will be a hospital and schools, and an effort will be made to run the whole business, so far as labor employed is concerned, on the plan that has been followed in the construction of the Panama Canal.

The machinery works for mortar mills and stone dressing will be run by oil, gas, or electric power, comparative estimates for which have been called for.

The railway station nearest the works adjoins Seringapatam, on the Coorg Road, and will presently become a busy center for the discharge of materials. The bowlders are to be had at the site, and lime is being collected in thousands of tons from the adjoining fields of French Rocks and Mandya.

American engineers have had so much to do with engineering works in Mysore State that it is altogether likely that American machinery and American influence will play considerable part in the construction of this great dam and in the distribution and use of water after it has been accumulated. The splendid opportunities of this kind to be taken advantage of in India require competent engineers on the spot.

The Bangalore Tramway Project.—At present about 200 horsepower of the current from the Cauvery Falls is available for the electrification of the Bangalore tramway, upon which work has begun. When the reservoir is complete the available power will be about 5,000 horsepower more. Work on the tramway is in charge of Mr. Beames, the Chief Electrical Engineer in Mysore.

The survey indicates that about 10 miles of the line will be laid from Besvangudi, south of the fort, to Frasertown, in the north of the civil and military station, with a branch from the city to the Malleswaram extension.

The Indian Irrigation Program:—In the financial statement of Sir Fleetwood Wilson for the ensuing fiscal year, information was given as to the irrigation schemes sanctioned or awaiting approval. It was stated that, in addition to canals in operation, there are altogether 55 projects under construction, awaiting sanction, or being examined by the professional advisers of the Government of India. They include 26 works classed as "productive" and 23 classed as "protective," and are designed to irrigate 8.80 million and 1.18 million acres, respectively, at a total capital cost of a $150,000,000 for the productive and $31,600,000 for the protective works. The former are estimated to yield a net return of 7.28 per cent on the capital. Satisfactory progress is being made with the greatest undertaking now in progress the triple canal project in the Punjab; and Sir Fleetwood Wilson announced that the Upper Chenab Canal will be opened in May or at latest October, while the Upper Jhelum and Lower Bari Doab Canals will be ready in 1914. [Details of this construction appeared in Daily Consular and Trade Reports for Jan. 12 and Oct. 7, 1907, and Apr. 3, 1912.]

It was announced that the Ghaggar, Twante, Mahanadi, and Wainganga Canals have been sanctioned. The scheme for the first of these projects was submitted by the United Provinces Government, and the cost is estimated at under $1,215,000. The Twante project is for a navigation canal along an important trade route in Lower Burma, to cost $2,362,000. The Mahanadi and Weinganga canals will take off from those rivers in the Central Provinces, where at present State irrigation works are almost nonexistent. Their estimated cost is $4,455,000.

The Government of India now have before them the detailed scheme for the introduction of perennial irrigation in Sind, of which the Sukkur Burrage will be the pivot, though the main outlay will be for the Rohri Left Bank Canal. Between them these works will cost not far short of $21,900,000. The Cauvery Reservoir project [described in Daily Consular and Trade Reports for Jan. 25 and Dec. 28, 1911], estimated to cost $12,500,000, is for the construction of an immense dam attaining a maximum height of 201 feet and an average height of 113 feet. It will impound sufficient water to irrigate 4,750,000 acres, and will bring into existence a vast artificial lake having an area of 58 square miles. Another most important scheme on the list for the near future is the Sarda-Ganges-Jumna feeder project. It is estimated to irrigate over 1,500.000 acres, when account is taken of the additional supplies which existing works in northern India will derive from it.

NEW COMPANIES

The Bulletin Publishing Company has been incorporated.

The incorporators are Wm. H. Anderson, Chas. S. Derham, Wm. Crozier, A. R. Tuohy, and Carson Taylor. The capital stock is £100,000.

Mr. F. L. Wilson, Treasurer of the Moro Province, has submitted his resignation from the government service, effective May 1st, 1912, and with Mr. Guy Holland will engage in the lumber business at Kolambugan, Pangil Bay, north coast of Mindanao.

The Kolambugan Lumber and Development Co. is in process of organization. It will have an authorized capitalization of £150,000, of which £100,000 will be paid in. Mr. Holland is president of the company and will have charge of the mill operations, while Mr. Wilson is secretary-treasurer and will take charge of the business end of the proposition. Mr. Holland had already established a sawmill at Kolambugan, which is now merged into the company.

The company will begin sawing about May 1st. The mill has a capacity at present of twenty-five thousand board feet of lumber per day, which it is the intention to increase to fifty thousand as soon as the necessary, machinery can be imported. Their concession is said to be the best in Mindanao with heavy stands of hardwoods. In fact the concession contains a large stand of pure molave which is readily accessible to the mill.

The Eastern Lumber Company, a newly organized concern, has shipped a complete logging outfit, to Sibuyan an island situated between Mindoro and Romblon, and will begin milling operations as soon as the machinery has been put up.

Milling machinery was shipped to Sibuyan by the same company some time ago, and the logging outfit followed on the Maritima steamer

Belgika which left Manila a few days ago. A logging engine, a 45 h. p. boiler and about 6000 feet of cable were shipped on Belgika.

The island of Sibuyan comprises an area of 171 square miles, and practically the whole island is densely timbered. There is enough timber to keep a saw mill going for 200 years. The principal woods of Sibuyan are apitong, tanguile, camigon and narra, while red and white lauan are found in smaller quantities.

The Eastern Lumber Company was incorporated recently by J. W. Holland (president), Calvin Horr (vice-president), D. N. Hanna (secretary-treasurer), Perry McKown, and G. W. Walker. The Manila office is at 1353 Calle Anloague.

The Philippines Engineering and Machinery Company.—Has been organized and incorporated with a capital of £100,000 to introduce modern machinery throughout the islands.

The new company is composed entirely of Filipinos who believe in the future prosperity of the islands and who will make a specially of introducing modern farming machinery as well as machinery for other purposes, such as sugar mills, sawmills and electrical machinery for the provincial municipalities.

The object of the company as set forth is to import all classes or modern machinery, agricultural, maritime, electrical and stationary engines, to buy and sell and engage in a general machinery business.

The new company starts off with a capital of £100,000, divided into 4,000 shares with a par value of £25 each, with main offices in Manila. The directors of the company are Don Ramon Irureta Goyena, Don Joaquin Garcia Lopez, Don Elias Zaragoza, Don Vicente Marasigan, Don Juan C. Arenas, Don Juan Codina Sinio and Don Antonio de la Riva.

The Inter-Island Express Company, has been incorporated under the insular corporation laws with a capital of £150,000, divided into 1,500 shares with a par value of £100 each.

It is the object of the company to carry on a general brokerage and transportation business, for the clearance and shipment of goods, to act as forwarding agents, receiving and shipping goods for themselves and acting as agents, for others, and to conduct a general ticket office for the sale of passenger tickets to all points in the Philippine Islands and elsewhere, with main offices in Manila.

The directors of the company are Messrs. B. W. Rice, F. J. Perrine, G. B. Wicks, H. B. Pond, J. E. McClelland, J. B. Lewels, and F. K. Schnitzler.

The Philippine Export and Import Company has been incorporated with a capital of £250-000.

The stock of the company is divided into 2,500 shares at a par value of £100 each, 500 shares to be designated as "preferred stock" and the balance as common stock.

The Company will engage in a general merchandise and commission business throughout the Philippine Islands.

The directors of the company are Messrs. E. M. Loffler, S. M. Berger, D. Latimer, Sydney Schwarzkopf and W. Breaker. Mr. Schwarzkopf has been elected treasurer of the new company.

Ragay Gulf Lumber Co.—A new lumbering enterprise is in the field and has obtained a forest concession comprising an area of 450 square miles on the shores of Ragay gulf. An up-to-date logging outfit and sawmill machinery will be ordered at once from the United States, and operations will be begun as soon as the machinery arrives and is installed.

The undertaking is financed by E. J. Lane, of Seattle, and R. O. Russell and M. A. McLaughlin, of Salem, Oregon.

A branch of the American Trading Company has been opened in the old McCullough building Manila and will be managed by J. H. Allison.

COMMERCIAL

Tea Movement.—Owing to the unsettled conditions in Shanghai and Chefoo caused by the revolution, this season's tea from Hankow, amounting to over 322,580 tons, was forwarded to Russia over the old caravan route, Urga to Kiakhta, instead of via Vladivostok as in former years.

Timber Prices.—Owing to the strong demand in Vladivostok for timber, many contracts for the export of timber have been canceled. Sawn timber, 40 per cent cedar and 60 per cent fir, is selling at 30 cents per cubic foot.

Rebate Reduction on German Steel Exports.—With regard to the rebate granted by the German Coal Syndicate, the syndicate has decided that the rebate of 1½ marks (35.7 cents) per ton of coal, purchased from it for the purpose of working up iron goods manufactured from material bought from the Essen Pig Iron Syndicate and eventually exported, shall be abolished as from June 30, 1912.

Referring to the announcements which have appeared recently in the press, the German Steel Works Syndicate allows a rebate of 15 marks ($3.57) per ton only to firms (non-members of the syndicate) who buy their steel goods from the syndicate, and only if proof is given that the goods are eventually exported. The steel works syndicate does not pay any bounty to its own members, as all its members' produce is sold through the Dusseldorf Steel Works Syndicate, but only allows a rebate to non-members, comprising a few "pure" rolling mills, which do not produce the steel themselves, but are obliged to buy it from the steel works syndicate. The above-mentioned rebate of 15 marks is to be shortly reduced to 10 marks ($2.38) or less per ton, and is eventually to be abolished. Over 90 per cent of all the German iron and steel works are members of the steel works syndicate. The number of "pure" works—i. e., "pure" rolling mills or "pure" black furnaces, are getting very scarce. Amalgamations of coal-mining companies, iron-ore companies, blast furnaces, rolling mills, and steel works are the order of the day; there are plenty of firms who own iron or coal fields and also blast furnaces or steel works. These firms have the advantage of cheap coal—producing it themselves—and are also members of the steel works syndicate. Whereas, formerly, works endeavoured to increase their dividends by increasing their turnovers, nowadays firms increase their dividends by amalgamating or by producing all their raw material. The "pure" works are the exception and the "mixed" works are the rule at the present time. (C.R.)

Russian Steel Bar Syndicate.—From information received it appears that two of the members have withdrawn from the Russian Steel Bar Syndicate, which is a subsidiary of the Russian Iron and Steel Syndicate, better known as Prodamet. The membership of the bar syndicate is now 25, and as a consequence of the readjustment of the allotments those of the Dnieprovienne, the Russo-Belge, the Novorossisk, and the Kramatarskaja have been increased, the increases in the case of the first three at least being justified by considerable extensions of plant. On the other hand, the combined allotments of the Donetz-Yourievka, the Ural-Volga, and the St. Petersburg Rolling Mills Co. have been reduced to the extent of 1 per cent.

Diesel-Engine Combine.—It is reported that an amalgamation is contemplated between the Diesel Engine Co.: Carels Bros., a Belgian undertaking that manufactures Diesel engines; and Davey Paxton & Co., of Colchester. The capital of the combined undertaking is placed at £750,000 ($3,650,000), of which between £400,000 ($1,947,000) and £500,000 ($2,433,000) may be publicly issued, and the balance held in reserve. Considerable developments are reported in connection with the Diesel engine, and this amalgamation is probably for the purpose of assisting these. The system of giving other firms a license to manufacture Diesel engines, however, has proved successful and is not to be discontinued.

Railway Economies in Coal.—The greater attention given by British locomotive engineers to the superheating of locomotives, with consequent economies in coal consumption ranging up to 20 per cent, has led to a great improvement and simplification of earlier designs. Foreign types of superheaters have been used, but there is said to be a growing disposition among British railway engineers to employ their own designs. The Robinson tube superheater, the invention of the chief mechanical engineer of the Great Central Co., has given satisfactory results. Although it has been in use for only a few months, nearly 200 Great Central engines already are being equipped with it. It is also being adopted by the Great Northern, North Eastern, Caledonian, South Eastern & Chatham, Tilbury, and other railway companies.

Western Electric Booklet.—There are to-day many business men who unfortunately for themselves, are doing without many things which would enable them to work in greater comfort and, in general, conduct their business with increased efficiency. That such a state of affairs exists is not the fault of the business men but rather due to the fact that they have not been told in the right way. Realizing this, the Western Electric Company has recently published an attractive little book aptly named "The Silent Partners—A true Story" The book, written in an easy, colloquial style, is so convincing that the reader wants to invest in everything described therein. The advantages of Western Electric Inter-phones as time and step savers; of desk, bracket, ceiling and counter fans as creators of coolness; of ventilating or exhaust fans as fresh air producers and of large and small motors for shop and factory use, are set forth cleverly.

During the past decade, the public has come to accept the telephone as an every day sort of thing, good for talking to some one else miles away; but owing to the familiarity which such continued speaking acquaintance has bred, has probably never given a thought to the delicate workmanship necessary to turn out a transmitter which really talk well.

The transmitter, which is found on the great majority of telephones, is made up of fifty-nine details or parts, not including over fifty thousand granules of carbon, which are encased in a closed cup and form what might be termed the "dynamo" of the instrument. Each detail of the transmitter is made as carefully as the most delicate part of an expensive watch. The average person, rarely dealing with dimensions less than one-eighth of an inch, will scarcely realize what it means to manufacture very small parts whose dimensions must not vary more than one-thousandth (1/1000) of an inch either way. The outside of the transmitter is compact appearing and strongly built. This is necessary on account of the fact that it is the housing for the "details made with wondrous skill."

Through the medium of these delicately manufactured Western Electric instruments, it is now possible to transmit speech from New York to Denver, a distance 2050 miles. Less carefully made transmitters would fail utterly in such a project. In a short time the line will be extended to San Francisco, when, if the hopes of the telephone engineers, who are

engaged in the work, are realized the dream of trans-continental telephone communication will have come true.

Timber Shipment.—Two cargoes of Manchurian and Ussuri (Siberian) timber were shipped from Vladivostock to England during December. Fifty carloads of ash veneer were included.

Cheap Meat.—The peasants of western Siberia, owing to the poor hay crop, are compelled to dispose of their cattle, and beef in Kurgan and other places is being offered at 2.2 rubles per pood (about 3 cents per pound).

The Russian Flour Milling Co., Vladivostok, has contracted for 1,083 tons of Australian wheat, at 60 cents per pood (36.112 pounds), c. i. f. Vladivostok.

Fiber Hats.—The first direct shipment of Formosan fiber hats to the United States has been made. The Formosan hats resemble the Panama hat, but are produced more cheaply. They are export to America and other countries in large quantities via Japan. The total export of these hats to Japan and other countries during the last year amounted to over 1,000,000, valued at $800,000.

Opium, Formosa.—The total income derived from the Government Opium Monopoly for the fiscal year ending March 31, 1912, is estimated at $2,500,000, against $2,400,000 the preceding year. This increase, it is declared, does not refute the claim that the number of opium smokers is decreasing annually. The increment of revenue arises from the advancing of the price of opium and from the preference shown by consumers to superior quality of opium paste. The total number of licensed smokers is 86,282 Formosan men and 12,705 women.

Salt, Formosa.—The first shipment of salt from Formosa to the Philippines was made last December by the Mitsui Bussan Kaisha. Its value was $1,174. The estimate of salt to be exported from Formosa the next fiscal year, April, 1912, to March, 1913, is to Japan, 90,000,000 pounds; to Chosen (Korea), 17,000,000 pounds; to Asiatic Russia, 25,000,000 pounds; and to Karafuto 5,000,000 pounds. The manufacture of salt is from sea water evaporation, and the growing enterprise is one of the four Government monopolies.

Wheat Sales.—Due to the high price of wheat in Manchuria and the short crop, local flour-mill owners, who also own mills in the Russian Maritime Province, have purchased Austrian wheat for their Siberian mills to the extent of about 3,500 tons. The prices paid are a trifle higher than the current Manchurian price, but they fear that heavy purchases in Manchuria would cause a shortage of wheat for the Harbin mills, in addition to raising the local price to such a point that it would be necessary to close the mills.

Due to the high price of Manchurian wheat, American flour is now being sold as far north as Kuanchengtzu, and it is confidently predicted that it will soon be on sale in Harbin and will be able to successfully compete with flour from the local mills. As in the case of American cotton goods, this is due entirely to exceptionally favorable conditions and gives no guaranty of the permanency of the sale of American flour in this market.

Horse Breeding in China.—The Chinese Government has taken up the matter of breeding horse for general purposes and particularly for cavalry mounts. It is understood that the breeds introduced from Europe some time ago have not led to the desired improvement in the native animals. There are two strains of horses in northern China, the Monogolian, a small-sized but very vigorous animal, and the Ilian, a tall handsome horse much resembling its Arab and Persian relatives. It is thought that a proper crossing of these breeds will secure the desired strain.

The Government Veterinary College at Paoting affords instruction to a large number of students, 180 vacant places being open to matriculation annually. From lack of care, bad feeding, little or no scientific breeding, and a lack of trained caretakers for even the best animals, horses in China have come to be of little value for any purpose. Improved cattle and horse breeding are essential to modern agricultural development in China.

PLANTATIONS

Formosa.—About 20 Japanese business man have organized the Taiwan Norin Kabushika Kaisha, capital $250,000, to raise rubber on 3,600 acres given it by the Formosan Government. The company will also grow bananas, pineapples, and sugar cane for profit until the rubber trees are tapable. Many people appear anxious to raise rubber in Formosa, and seeds from the Malayan Islands have been distributed for experimental growth.

Although Government cotton-growing experiments in Formosa have not been encouraging, the Taiwan Menka Saibai Kumiai (Formosa Cotton Cultivation Association) has been organized to raise cotton experimentally in the central and southern parts of the island.

Camphor-tree afforestation is carefully nurtured by the Government, which in March distributed 3,855,552 young trees for this year's plantings.

Twenty thousand pineapple plants arrived yesterday on the steamer Bellerophon from Singapore for the Luzon Pineapple Plantation Company, and 80,000 more plants are on the way, also from Singapore, for the same company.

This total of 100,000 plants will be planted on the Luzon Pineapple Company's plantation in Nueva Ecija. This is the first attempt at cultivating pineapples on a large scale in the Philippine Islands.

Tea and Orange Growing.—The tea industry in central Formosa will be increased at the expense of the sugar industry. Already farmers who have been growing sugar cane are turning to tea culture. The special reason for this change is the high price of tea this season and the low price of sugar cane. The teas of this locality (Horisha) produced 186,000 pounds during the spring and summer of 1911.

The cultivation of oranges in north and central Formosa is becoming an industry of increasing importance. Plantations, both subsidized and unsubsidized, are flourishing, and the value of the crop this season is $153,813. In 1907 the value was only $84,094.

S. M. Railway Agricultural Program.—The following horticultural and agricultural work is planned for 1912, along the South Manchuria Railway area:

Saplings will be distributed to the principal stations, chiefly for hedge plants, shade trees, and improvement of appearance. Should the company's nursery at Hsiungyocheng lack a sufficient supply, the shortage will be supplied from other sources.

Growing the mulberry tree is to be taken up in earnest. Both the climate and soil of south Manchuria encourage sericulture. Should the initial undertaking at Dalny prosper, tree plantings will be extended northward.

Young fruit trees will be distributed to railway employees along the lines for planting about their residences, to encourage a taste for horticulture and to experiment in orcharding.

Experiments in rice farming have been made at Mukden, Hsiungyocheng, Chienchinchai, and other places with fair results at each place. Haichong, Liaoyang, Tiehling, and the country along the Mukden-Antung line are also pronounced to be well suited to rice farming. Several new places will be tapped this year and the railway company is prepared to offer sundry facilities in the lease of lands, irrigation, etc., where necessary. For instance, wells may be bored at the company's expense if it considers such help fully justified.

A notification has been issued to the effect that all applications for information on any of the foregoing subjects should be sent to the company's district agents at the various centers.

Tenders for Steel Coal Vessel.—The Quartermasters Department, Philippine Island, will open tenders on June 15, for a steel coal vessel to carry 6,000 tons coal. The vessel is to be fitted with a tower and the necessary apparatus for weighing coal and discharging it through telescopic tubes into bunkers or elsewhere. She is to be self-trimming and when loaded must not draw more than 18 feet.

The boiler is to be of the Scotch return type built to a factor of safety of 5 for 150 lb. working pressure and sufficiently large to give over 50 per cent. horse-power above the full load with all machinery in operation.

Remarkable Voyage of the "Harpoon II."—A 9,000 mile trip under all conditions of wind and weather in a 23 feet motor boat driven by a 7 H.P. engine is one that would make the most enthusiastic motor boatman think twice before attempting. Such a trip was recently completed, however, by three young men of Jacksonville, Florida, H. A. and H. J. Dillovan and John De Grott, who left that city on May 4, last and voyaged by the "outside pessage" to Montreal calling at practically every city, stream and bay on the eastern coast of the U.S. and Canada.

While the crew called themselves "Marine Hoboes" the name is misleading as they are a fine lot of boys who made the trip for the pure love of sea and accepted everything in the way of work that offered at the different ports of call and this made enough to fill the galley and tanks for the voyage to the next port.

The "Hargoon II" was the tiny craft that safely carried the three pleasure seekers to Montreal and back, and a sturdy little 7 H.P. two cylinder Type "E" Fairbanks-Morse Marine Engine furnished the Kick. A feature of the trip that made it one long to be remembered by the crew was the many courtesies extended them by lovers of the sport. At a number of places they were lavishly entertained while they were made honorary members of many power boat and yacht clubs. Even the Colonial Yacht Club of New York extended memberships to them. All in all the log of the "Harpoon II" with its record of varied and unique adventures spiced with thrilling encounters with wind and wave, would make delightful reading, even for those who have never journeyed down to the sea in boats or never bucked a head sea on a "dusty day."

THE HONGKONG LAW COURTS

On January 15 this year the new Law Courts at Hongkong, illustrations of which appear on this page, were opened by the then Governor, Sir Frederick Lugard, with fitting ceremony.

The old premises in Queen's Road had been in use since 1862 and had long become entirely adequate for the purpose for which they were utilized. The erection of premises more imposing in appearance and more adapted to the growing legal requirements of the colony had often been talked of, but it was not until 1900, that the original estimates were prepared. The foundation stone of the Courts of Justice, as they are now called, was laid a little over eight years ago by Sir Henry Blake. Work in connection with construction was extremely slow and the original estimates were altered and revised to such an extent that it will not be possible to know the actual cost of the courts until the next Budget statement is made in Hongkong.

The building is constructed of granite and over 12,000 tons were used in the structure. The original design provided for another storey, but to save expense the Public Works Department evolved the present roofing—Chinese or Korean. The result is hardly a success from an æsthetic point of view, and the fact that adjacent buildings are much higher detracts from the general appearance. However on the occasion of the formal opening the Chief Justice, Sir Francis Piggott, said that he thought that the great court and even the two lesser courts were among the largest in the British Empire.

The building was erected by Chinese contractors under the supervision of the Public Works Department.

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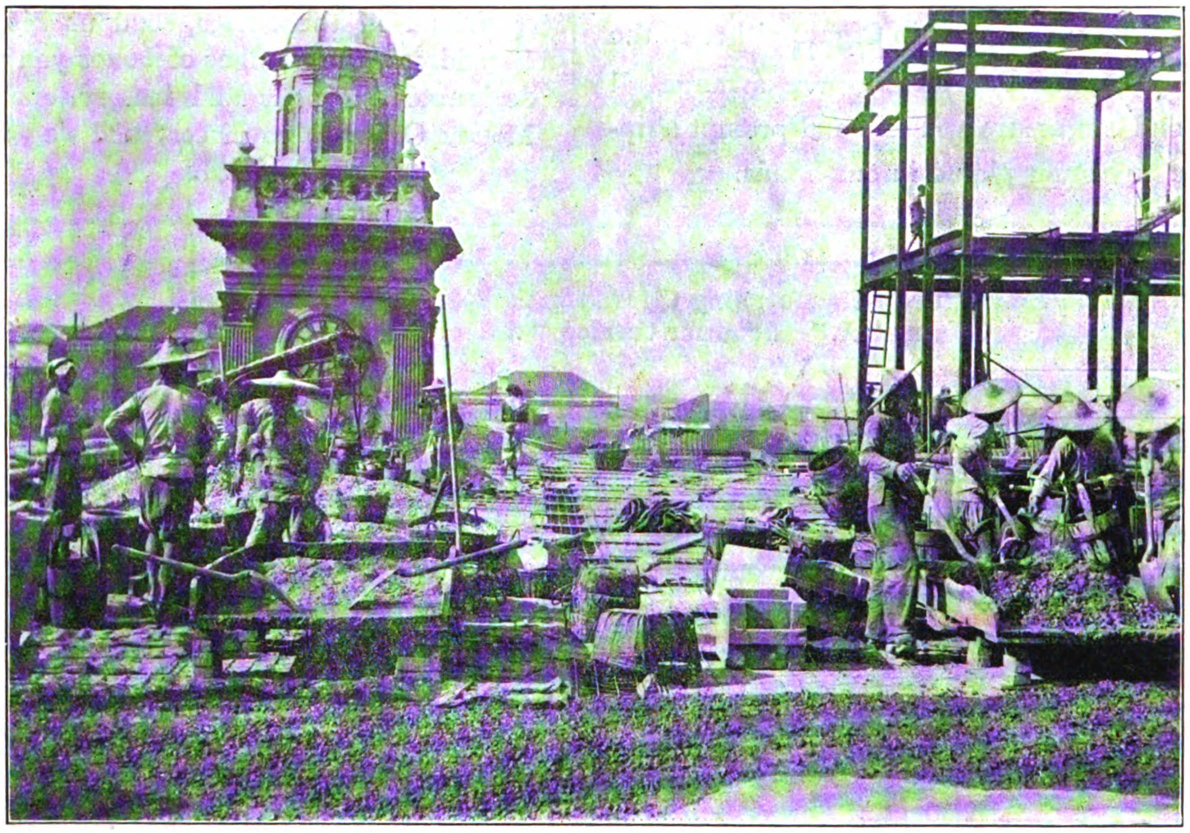

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THE FAR EASTERN REVIEW

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Engineering
Finance ❁ Commerce

Vol. IX., No. 2. ⊛ SHANGHAI—MANILA ⊛ July, 1912.

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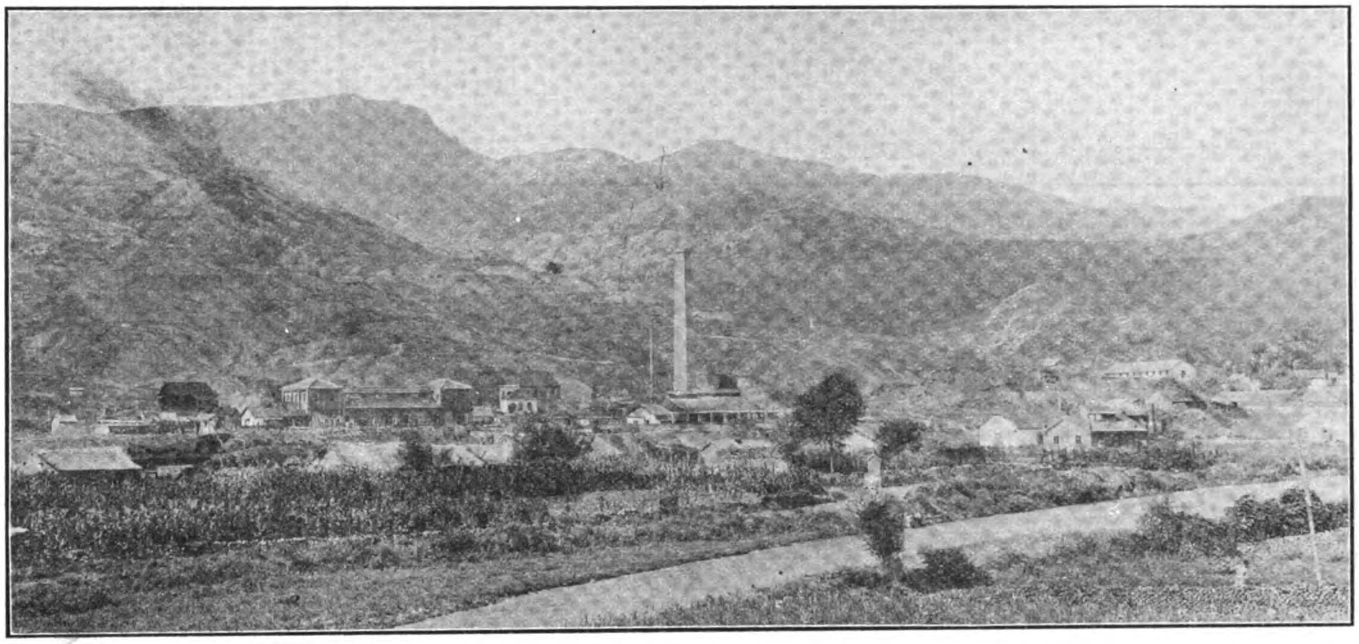
THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, JULY, 1912 No. 2.

THE MINERAL PRODUCTION AND RESOURCES OF CHINA*

BY THOMAS T. READ,† SAN FRANCISCO, CAL.



GENERAL VIEW OF THE PENCHIHU COLLIERY, LOCATED AT PENCHIHU, ON THE LINE OF THE ANTUNG-MUKDEN RAILWAY, MANCHURIA. UNDER JOINT CHINESE AND JAPANESE MANAGEMENT. OKURA & CO., GENERAL MANAGERS.

I. INTRODUCTION.

When so much has been written upon a subject on which so little definite information is available as upon this, some reason must needs be assigned for adding to the volume of literature. A sufficient reason is found in the probable great future importance of China as a producer of mineral wealth. The present undeveloped state of mining in the country is due to many causes, among which the most important are the relatively simple needs of the population, the lack of transportation facilities, the inelastic regulations governing the industry, and the superstitious reluctance of the people to make excavations which might disturb the spirits of the earth and air, or of ancestors.

Iron is the metal most in demand, yet the needs of the population, until recently, only made necessary a production of approximately 0.5 lb. of iron per capita per year. The present annual production of iron for domestic consumption, in the United States, is nearly 600 lb. per capita. The curious state of development of transportation in this interesting country has been a greater handicap upon the mining industry than upon any other. The point upon which it hinges is the absence of a road-system. Except for a few military roads, now almost impassable, there are no roads in China; that is to say, there is no land which is set aside as a right of way, belonging to the commonwealth. Throughout the agricultural districts, generally speaking, the entire area is in private ownership, and the lines of travel are between fields. There is a constant struggle for existence between the owners of the land and the travelling public, with the natural result that the so-called roads usually are simply lines along which it is merely possible to travel. Most merchandise is carried in baskets over the shoulder, pushed in wheelbarrows, or transported on pack-animals, to the nearest stream. Really cheap and efficient transportation is confined to the rivers, and great ingenuity is exhibited in utilizing them to the fullest extent. On the Lan river, for example, the boats, to use an expressive colloquialism, "can float in a heavy dew." The regions where mineral wealth is abundant are naturally but poorly supplied with navigable streams, and it is only where Nature has been so kind as to gather together in one place all the materials necessary for the extraction and reduction of the minerals that any considerable industry has been able to develop. Now railroads are penetrating all parts of the country, the streets built in the cities are being extended as roads through the surrounding territory, and the mineral industry is taking on a new aspect.

Theoretically the mineral wealth of the country is the property of the central government, and is only worked by permission upon a royalty basis. Practically this is difficult to enforce, and there have grown up relationships between the operators and the government which are complicated in the extreme. The development of the mining industry is correspondingly hampered, and it is to be hoped that a simple and direct code of mining-regulations may be put in force at no far distant date. The importance of the superstitions regarding graves and "Feng-Shui" has been over-emphasized. It has undoubtedly operated to restrict prospecting-work, but where valuable deposits are found it is always possible to have graves moved for a reasonable sum, and it is but seldom that a regard for "spirits" is allowed to operate to financial disadvantage. With the spread of education this factor will lose the limited importance it now possesses.

Easily first in the mineral wealth of China are coal and iron. Willis[54] (reference is to bibliography given at the end of this paper) has estimated that the anthracite-resources of Shansi and adjacent territory are equal to those of Pennsylvania, and while no estimate is possible of the total amount of bituminous coal, it is safe to say that it is also comparable

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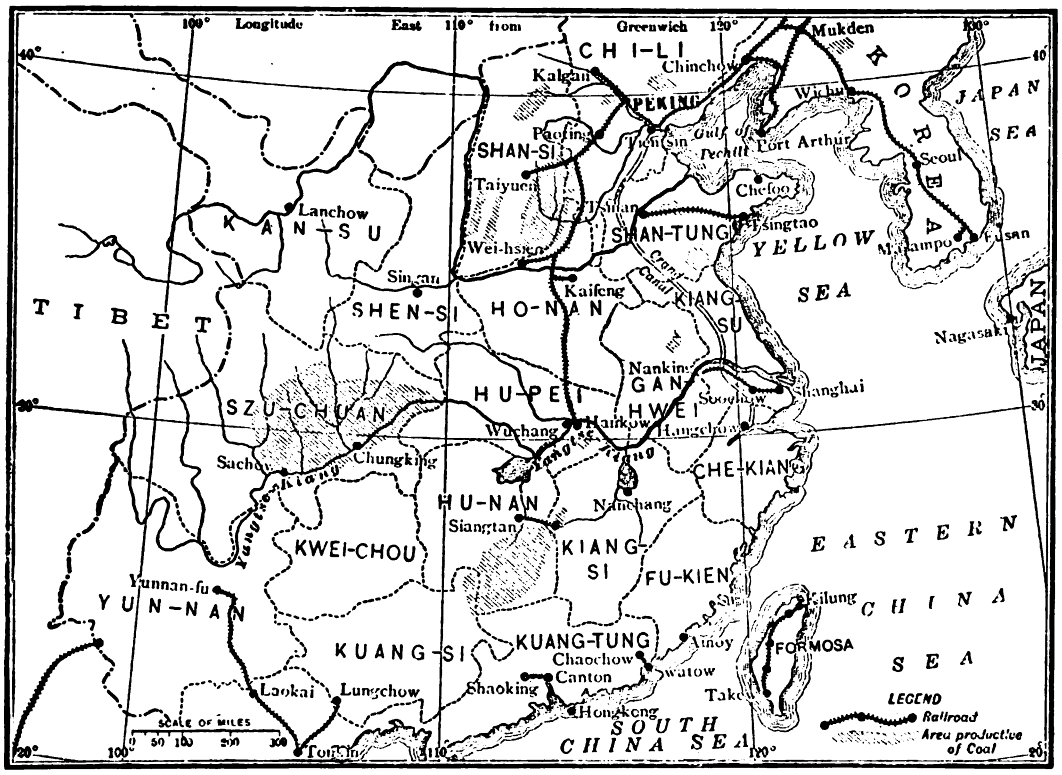
* Paper read at the Annual Meeting of the American Institute of Mining Engineers.

† Formerly Professor of Metallurgy, Imperial Pei-Yang University, Tientsin, China.



MAP OF CHINA, SHOWING COAL AREAS

with that of the United States. It is impossible as yet to estimate the iron-resources, for reasons given under the discussion of that metal, but there is every reason to believe that they are extensive and valuable; some progress has already been made in their utilization on a modern scale. The conntry is the most important producer of antimony, and ranks high in the production of tin. The production of copper and zinc is already appreciable, and the production of petroleum, while as yet small, seems to have much of promise. The production of gold, silver, mercury, and other metals, while worthy of notice, seems to offer less hope of great increase by the introduction of improved methods of working. It will be evident from the following pages that the mineral production of China is at present of no little importance, and her known resources are great enough to offer ground for the belief that considerable development can be expected in the future.

During three years of residence in North China, I visited a large number of districts of which the mineral production is now considerable. It was not possible, of course, to visit all, and for the exteme south and southwestern parts of the country, have been dependent upon the statements of others, but especially upon published reports of the notable group of French explorers and engineers who have extended their study of Indo-China to cover the adjacent areas. The report of Duclos, [13] and that of LeClere,[25] are especially important. Richthofen's monumental work[44] is of permanent value, as is that of the Carnegie Institution exploring party.[53] The latter deals only with general geology, but is of great interest as marking the first attempt to carry on topographic and geologic surveys in China with the precision attained in the United States. A very important paper is that of Willis,[54] who has made an admirable summary of the literature bearing upon the mineral resources of the Chinese country.

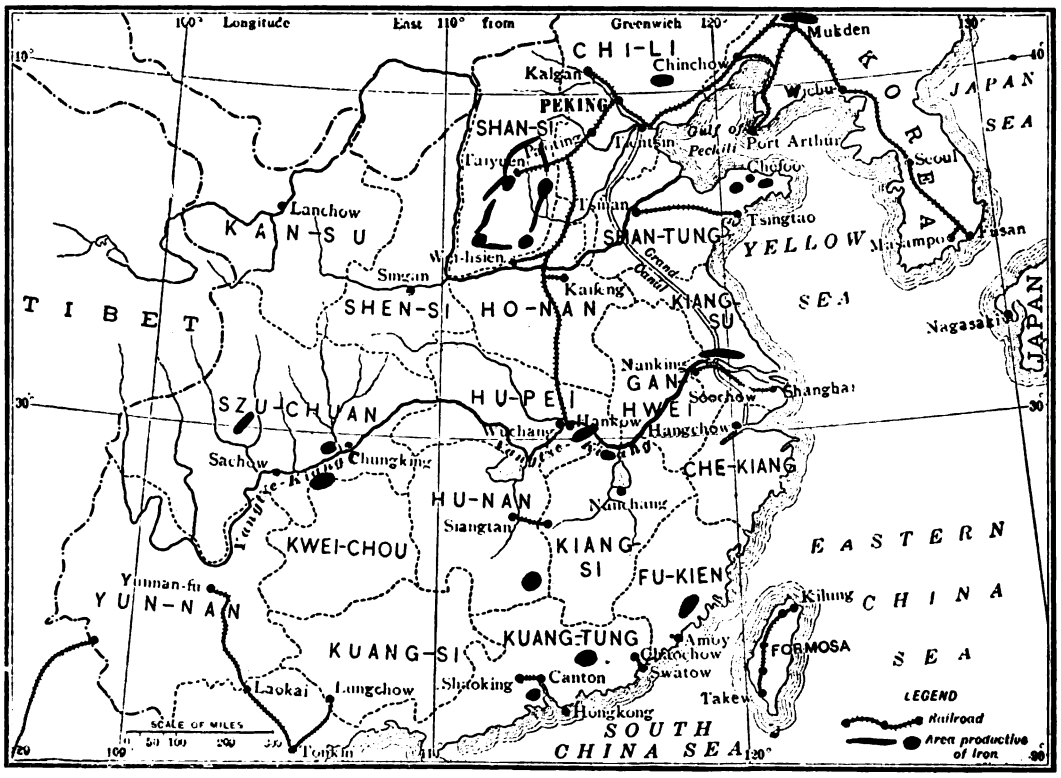
The bibliography which concludes this paper is not complete, nor has any effort been made to include all references to the subject. All the more important papers are included, but if any have escaped attention the correction will be welcome. Those who have carried on investigation in the Orient will appreciate the difficulty of the work. Important papers have been published in journals that are difficult or impossible to obtain, the native reports are entirely unreliable, and many areas of importance have never been adequately, described. In addition, there is much conflict between reports upon a single area, and often complete disagreement between figures as to present production. The following represents merely as close an approximation to the truth as now seems possible, and will require extensive revision in the light of future development. But having acquired, with much effort, an imperfect knowledge of the mineral resources of this great country, it appears a professional duty to place it in a form which may be of assistance to later workers in this broad field. Erroneous statements have probably been included, and it is hoped that the many engineers who have visited China will contribute further data.

In quoting from the reports of others the almost insurmountable obstacle of identification of place-names is constantly met. This is especially true of the French and German authors, whose spellings are often unrecognizable. Wherever possible I have given the latitude and longitude of the localities mentioned, except in the case of well-known places. Even this is unsatisfactory, for the most accessible accurate maps of south-western China are French and the longitude is given in degrees east of Paris, which is approximately 2° 20′ east Greenwich. The French notation has been followed in the case of points in Ssu-chuan, Yunnan, and Kweichou. This should be borne in mind in consulting the maps. In some cases where the spelling is obviously incorrect, or it has been impossible to identify the places, I have placed them within a semi-quotation mark 'thus,' and turned over the difficulty to the reader.

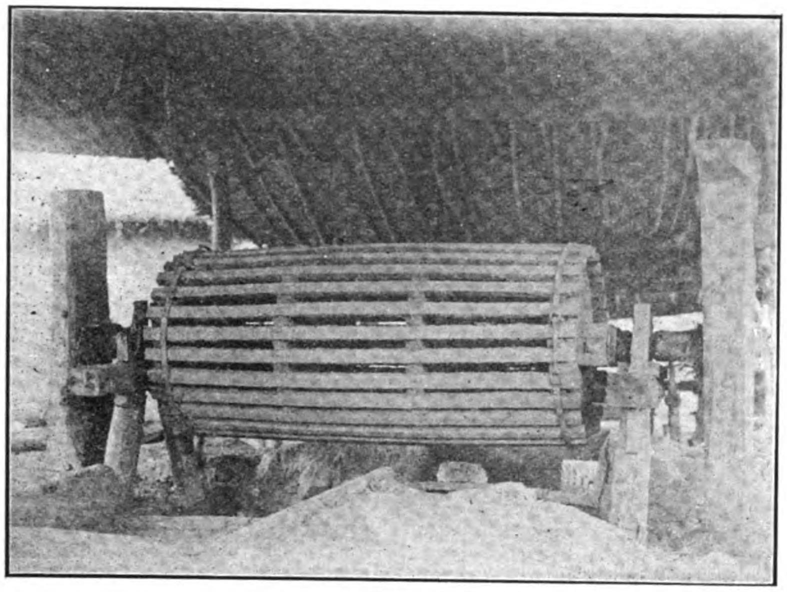
For convenience, reference is made by number in the text to the bibliography, given at the end of the paper; [43] is a good geography of the country and [8] is a fairly complete bibliography of China.

II. Coal.

Coal is easily the first of the mineral resources of China. The great extent of the deposits has already been indicated and a conservative estimate of the present production is 15,000,000 tons annually. The casual visitor to North China, where the winter climate is rigorous, seeing the children of the villagers, armed with rake and basket, engaged in collecting every scrap of vegetable material that can be utilized as fuel, is likely to wonder why coal is not more generally used. The reason is not recondite: the low cost of labour, the high cost of transportation, and the low scale of living put coal beyond the reach of the population in many regions. It is probably safe to estimate that one-half the cost of the food of an ordinary workman is chargeable to the fuel used in cooking it, and where the otherwise unemployed children can be sent out to gather grass and pull up the roots of the larger cereals, such as corn and *kao-liang*, there is little market for coal, except for industrial purposes. Near the mines, where coal is abundant and cheap, it is freely employed. The development fo railroads, steamships and industrial plants lliw not only create a greater

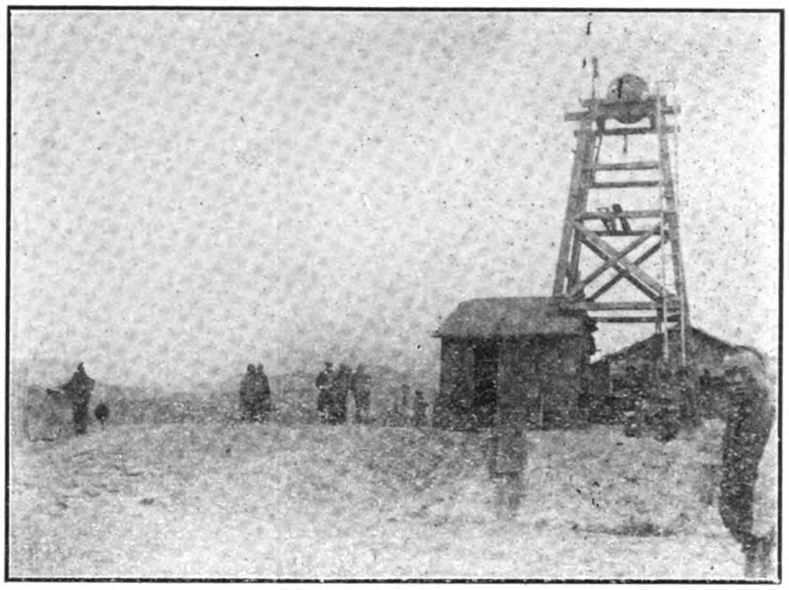


MAP OF CENTRAL CHINA, SHOWING IRON-ORE CENTERS



HAND WINDING APPARATUS

NATIVE COAL MINES IN CHINA

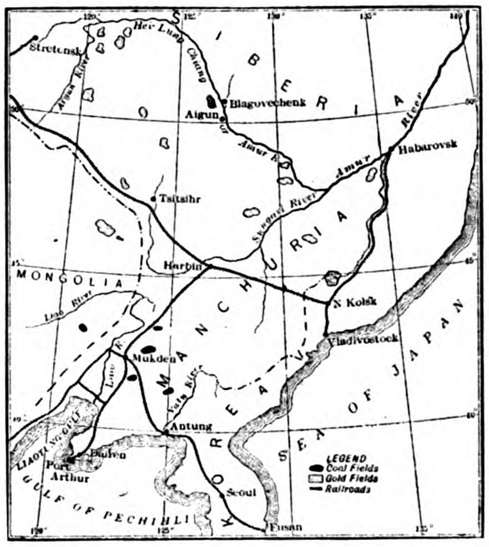


HEAD GEAR AT NATIVE MINE

market for coal, *per se*, but, by raising the scale of living through the higher wages paid for labour, will increase the consumption of coal for household purposes. The annual consumption of coal in the United States is approximately 3.5 tons per capita per annum; the consumption in China is approximately 1/25 ton per capita per annum. An approximate estimate of the present coal-production in China is given in Table I.

TABLE I.—*Approximate Estimate of the Present Coal-Production of China.*

Province	Anthracite	Bituminous	Sub-Bituminous and Lignite
	Tons	Tons	Tons
Manchuria	....	25,000	1,000,000
Chihli	840,000	2,090,000	150,000
Shansi	4,000,000	25,000	
Shensi	....	500,000	
Kansu	....	500,000	
Shantung	300,000	500,000	
Honan	1,000,000	....	
Ssu-chuan	....	500,000	
Kweichou	....	250,000	
Yunnan	....	300,000	
Chekiang	....	10,000	
Kiangsi	....	700,000	
Hunan	....	200,000	
Kuangtung	....	50,000	
Kuangsi	....	100,000	
Other provinces	....	100,000	
Total	6,110,000 5,900,000 1,150,000	5,900,000	1,150,000
Grand total	13,190,000		



COAL FIELDS AND GOLD FIELDS OF MANCHURIA

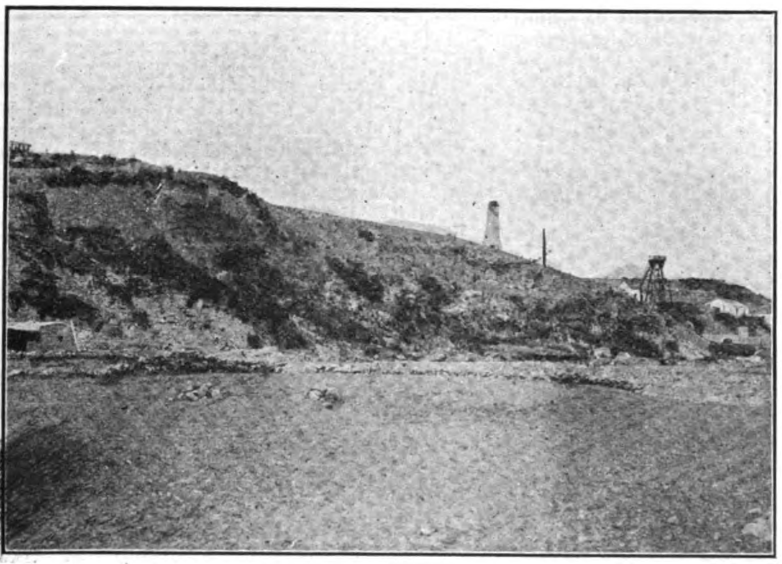
(After Purlington)

The sketch-map, Fig. 1, shows in general the coal areas of China. This map, as well as Fig. 2, has some misspelled names, as it was impossible to arrange for revision of the proofs.

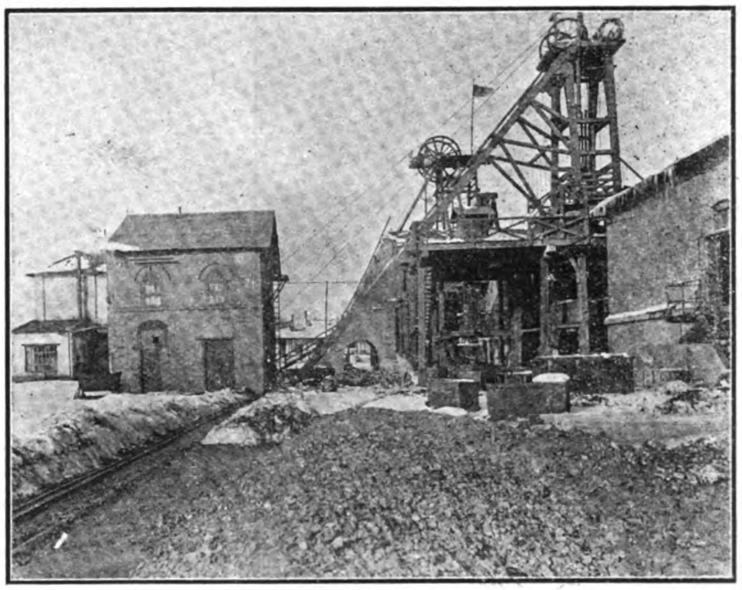
The coals of China are as varied in quality as those of the United States, but this difference should be noted: the amount of lignite is comparatively small, and the proportion of anthracite to bituminous is relatively larger than in the United States. As previously noted, Willis has estimated that the anthracite-resources of Shansi and the adjacent fields are practically equal to those of Pennsylvania. If this is in error it is probably upon the safe side, and the total coal-resources of the Chinese country seem likely, upon careful mapping, to compare favourably with those of the United States.

In the space at my command it would not be possible to give more than a brief outline of each of the important fields. The number of fields is so great that an attempt at classification would lead to too great complexities, and it will be simplest to consider them briefly by provinces.

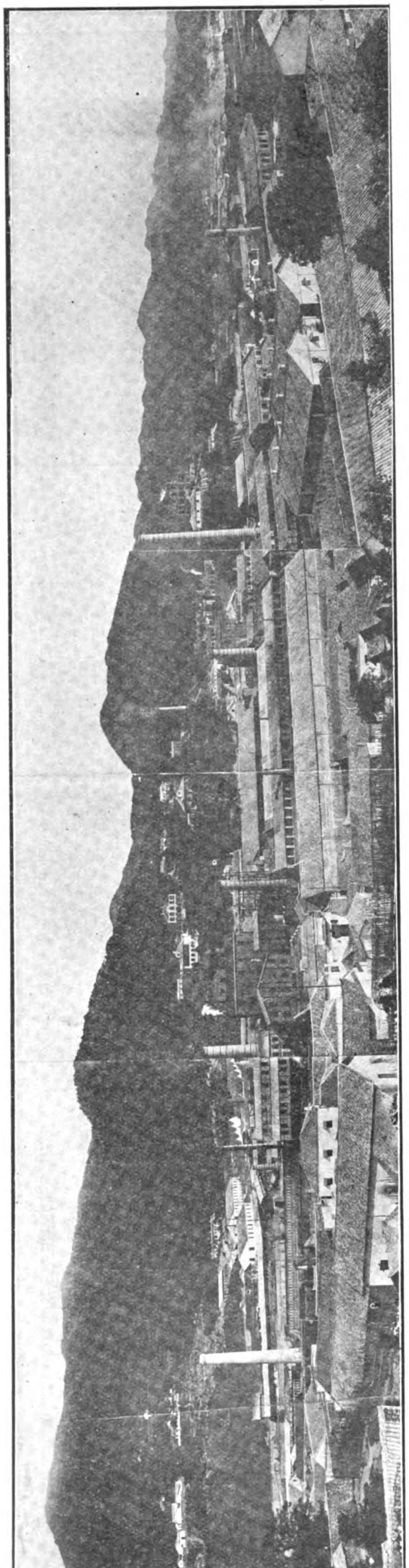
In Manchuria one large mine is now in operation at Fushun. This field, seen just above the word "Mukden" on the sketch map, has been described in detail, 38, 39, so nothing further will be given here than to state that the coal is a sub-bituminous of excellent quality. The mines, owned and operated by the South



MENTAKOU COAL MINE, NEAR PEKING



HEADFRAME OF NO. 2 AND 3 SHAFTS, TANGSHAN MINE



GENERAL VIEW OF THE PINGHSIANG COLLIERY

Manchuria railway, had a production in 1910 of 830,328 tons, and are expected to reach 1,000,000 tons per year when the second of the two pairs of deep shafts (18 and 20 ft. in diameter) are in full working-order. More recently the mines at Pen-hsi-hu, on the Antung-Mukden railway, have been developed; but, although I passed through the town in the autumn of 1910, I have been unable to obtain figures as to the production, which is probably small as yet, but is likely to develop when the standard-gauge line between Mukden and Antung is in operation. The chief engineer at Fushun stated in 1909 that the Pen-hsi-hu coal is a friable semi-bituminous, occurring in Jurassic strata, and not of especially good grade, but more extensive development may have disclosed seams of better quality. The same remarks will apply to Sai-ma-chi (125° E., 41° 30′ N.); owing to its distance from the railroad no very serious attempts have been made to develop these mines. All mines in the South Manchuria railway zone are to be developed jointly by Japanese and Chinese.

Just east of Kwan-cheng-tze (125° E., 44° N.), coal similar to that at Fushun occurs in several places, and though the attempts at working have not been very successful as yet, the seams at this place are likely to become of great importance, as the branch railroad to Kirin cuts directly across them. West of the Liao river (somewhere about 122° E., 43° N.) a valuable and important field is said to exist, but I have not visited the locality and have no definite knowledge of it. Some time since the Imperial Railways of North China attempted to exploit some seams of a true lignite a short distance north of the Great Wall, but they proved to be of too poor quality. Other localities where coal occurs are Yentai and Wu-hu-tsui, but the production is unimportant. Thin seams of coal can be seen in the cuts along the trans-Siberian railroad, and the Bureau of Mines for Manchuria has published a long list of places where coal occurs in Manchuria. The coals of the southern part of the province were described by K. Inouye in 1905.[20a] Coal occurs widely throughout the area; that at Fushun and near Kwan-cheng-tze is sub-bituminous and of Tertiary age; in the other districts the coal is semi-bituminous and of Jurassic age. No closer classification can be attempted as yet. The native consumption is generally supplied by small local mines. The South Manchuria railway and a considerable portion of the shipping-trade of Dalny (Tairen) are supplied by the Fushun mines. As the workable coal in the Fushun field has been estimated at 800,000,000 tons, Manchuria is well supplied with coal. But the Manchurian coals are very friable, furnishing but a small proportion of lump-size, and no good coking-coal has yet been found. The composition of the coals of Manchuria is given in Table II.

Chihli, which immediately adjoins Manchuria on the southwest and is the metropolitan province, is now the most important producer of coal, as can be seen from Table III, which gives a summary of the coal-output of Chihli province for 1909 by K. Y. Kwong, chief mining engineer for the Chihli Province Bureau of Mines, Tientsin. The composition of some Chihli coals is given in Table IV.

TABLE III.—*Production of Coal in Chihli Province for 1909.*

Lignite.

District	Locality	Tons.
Jehol district (118° E., 41° N.) coal-fields	Yen-pao-shan, Wo-chia-tze, Shih-t'ou-fen.	150,000
Total lignite		150,000

Anthracite Coal.

District	Locality	Tons.
Kin-Han railway district coal-fields	Tai-an, Fangshan-hsien (116° E., 39° 45′ N.), Sha-ho-hsien (114° 40′ E., 37° N.), Lin-ming-kwan, Han-tan-hsien.	600,000
Peking-Shanhaikwan railway district coal-field.	Shi-men-tsai.	5[illegible],000
Peking-Kalgan railway district coal-fields	Sin-pao-an	20,0[illegible]0
	Peking Western Hills (115° 45′ E., 40° 15′ N.).	150,000
Total anthracite		840,000

Bituminous Coal.

District	Locality	Tons.
Peking-Shanhaikwan railway district coal-fields	Kaiping { C.E. & M. Co., Ltd., mines, Linchow mines. }	1,400,000
Kin-Han railway district coal-fields	Lingshan	50,000
	Ching-hsing (114° E., 38° N.)	160,000
	Lincheng (114° 30′ E., 37° 30′ N.)	100,000
	Tze-chow (114° 20′ E., 36° 30′ N.)	100,000
Peking-Kalgan railway district coal-fields	Hsuen-hua-fu (115° 10′ E., 40° 50′ N.).	40,000
Lan-Ho and Jehol districts coal-fields		100,000
Chow-yang-fu coal-fields		140,000
Totaal bituminous coal		2,090,000

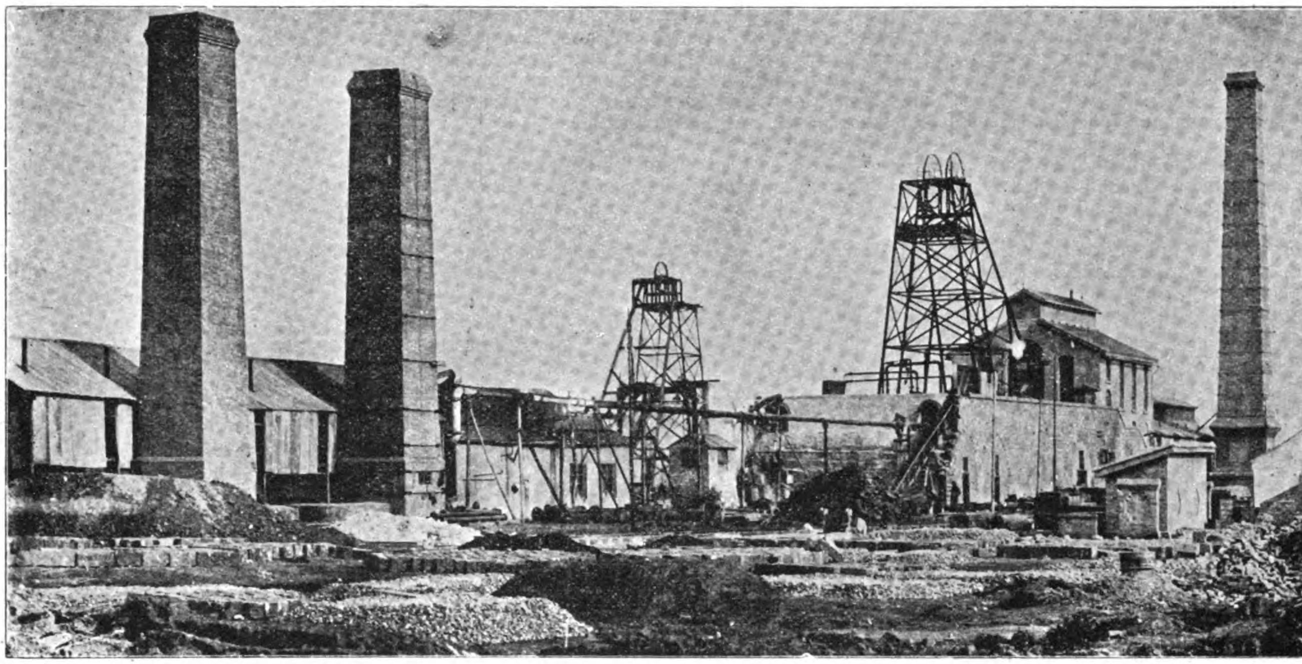
TABLE IV.—*Analyses of Some Chihli Coals.*

No.	Locality.	Moisture.	Ash.	Fixed Carbon.	Volatile Hydrocarbon.	Sulphur.	Fixed Carbon Ratio.	Analyst.	Remarks.
		Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.			
1	Tongshan, C.E.&M.Co.	1.00	16.67	56.78	25.55	1.01	2.22	C.H. Wang.	Coking, bituminous.
2	Tongshan, C.E.&M.Co.	0.84	18.02	57.19	23.95	1.46	2.38	C.H. Wang.	Bituminous.
3	Tongshan, C.E.&M.Co.	1.37	21.72	53.81	23.10	2.55	2.33	C.H. Wang.	Non-coking, bituminous.
4	Tongshan, C.E.&M.Co.	0.93	12.29	59.75	27.03	3.90	2.21	C.H. Wang.	Coking, bituminous.
5	Tongshan, C.E.&M.Co.	0.90	13.55	70.33	15.22	2.26	4.62	C.H. Wang.	Coking, bituminous.
6	Tongshan, C.E.&M.Co.	0.77	18.59	53.28	27.40	1.11	....	Average analysis furnished by company	
7	Linsi, C. E. & M. Co.	0.77	19.18	51.97	28.05	0.88	....	Average analysis furnished by company	
8	Ching-Hsing	0.54	13.49	61.16	24.81	2.26	2.46	C.H. Wang.	Coking, bituminous.
9	Chai-t'ang	2.11	6.67	68.23	22.99	0.19	2.97	C.H. Wang.	Non-coking, bituminous.
10	114° 30′ E., 38° 45′ N.	1.20	12.97	80.50	5.43	0.97	14.81	C.H. Wang.	Hard, dry anthracite.

The lignite and bituminous coal of the Jehol district is produced by native methods. The Kin-Han (Peking-Hankow) railway district anthracite-field and the Peking-Kalgan railway district field are northern and southern portions of one field lying a short distance west of Peking. Hoover [17] and Woo [56] have described the Chinese

TABLE II.—*Analyses of Manchurian Coals.*

No.	Locality.	Moisture.	Volatile Hydrocarbon.	Fixed Carbon.	Ash.	Sulphur.	Analyst.	Remarks.
		Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.		
1	Fu-shun	6.30	39.34	52.90	3.18	0.27	C. H. Wang	Average of 7 published analyses.
2	Fu-shun	4.43	40.33	48.89	6.35	1.00	Geological Survey of Japan.	
3	Wu-hu-tsui	2.70	11.42	76.69	9.19	0.50		
4	Pen-hsi-hu	0.96	21.66	66.06	11.32	0.84		Average of 3 published analyses.
5	Yen-t'ai	1.07	14.22	74.98	9.75	0.66		Average of 3 published analyses.
6	Sai-ma-chi	1.39	25.58	60.47	12.25	0.80		Average of 3 published analyses.



THE PEKING SYNDICATE COAL MINES, HONAN

Engineering & Mining Co. mines at Tongshan and Linsi in detail. These are the largest and most important coal-mines in China. They are owned by an English company, but it has been proposed by the gentry of the province that the concession be purchased by the Provincial government. Since the descriptions were written, the mines have been much developed and improved. They produce nearly all of the total of the 1,400,000 tons estimated above, as the semi-official Lanchow mines, in the same field, have only recently been started and, though well equipped, seem unable to operate at a profit. The net profit of the Chinese Engineering & Mining Co. mines for the year ending February, 1910, is given as £243,300. The Ching-Hsing mines, on the railroad Tai-yuan-fu, are worked under German supervision, and have both Chinese and German capital. The production in 1910 was 150,000 tons. The Lincheng mines are operated to supply the Kin-Han railway with fuel, and are under the supervision of K. Y. Kwong. They have an output of 800 tons per day. The coal-field at Tze-chou has been described by Drake.[10] The mines at Hsuen-hua-fu have only recently been opened to supply the Peking-Kalgan railway with fuel, and their production will probably increase considerably during the next few years; there is already a considerable production by native methods in this and adjacent districts. It is obvious that it would be possible to devote much space to a description of the mines of this one province, but they are so accessible and comparatively well known that, in spite of their great importance, I shall not discuss them further. The analyses in Table IV. show the characteristics of these coals, and it will at once be noticed that they grade by degrees from bituminous into anthracite.

In Shantung coal occurs in many places, but the larger part of the production comes from the mines owned by the Shantung Bergbau Gesellschaft, at Po-shan (118° 0′ E., 36° 45′ N.) and Fang-tze; 252,816 tons of anthracite coal having been produced at the former place in 1910, and 230,064 tons of bituminous at the latter. These mines have washing-plants. Some difficulty has been found in working, owing to faulting and disturbance of the beds, and the native papers say that there is little profit in their operation. In this, as in every other coal-field in China, there is a large amount of native mining upon a small scale. Farther to the southeast, near Yi-hsien (118° 36′ E., 35° 0′ N.), is a bituminous field which is said to be larger and better, but which I have not visited. The production of the native mines is already important. A large native company, called the Chung Hsing Kung Ssu, has been formed, machinery procured from Germany, and a railroad constructed from the mines 35 miles to the Grand Canal. This will probably be extended to connect with the Tientsin-Pukou railroad,* and when the latter road is in operation the production of coal in this district should become important.

Much has been written concerning the coal-fields of Shansi, and having spent some time in visiting the more important localities, the temptation is strong to describe them fully. But since others,[12, 54, 44, 45] have discussed them in more or less detail, I shall only refer to them briefly. These anthracite-seams are the most striking coal-beds in the country as they are so thick, so little disturbed, so well exposed, and so widely distributed, having an extent of nearly 200 miles north and south, and from 25 to 30 miles east and west. There are several seams, one of which is especially thick and persistent. Richthofen[44] estimated the area of the field as 13,500 sq. miles, and Drake[12] estimated the average workable thickness of the seams as 22 ft. As the beds are frequently but slightly inclined, this corresponds to a yield of over 22,000,000 tons per square mile of workable area, so it is safe to estimate that the anthracite-resources of this part of China are at least equal to those of the United States. Mining in this field is under the control of the Pao-Chin Mining Co., which was formed by the gentry of the province to repurchase the concession of the Peking Syndicate. Several shafts are making a small production, most of the present output coming from native workings. The area controlled by the Pao-Chin Mining Co. is of immense importance, and it is to be regretted that so little progress is being made. There were, in 1910, no trained engineers in the employ of the company, though there are numbers of properly qualified Chinese engineers available. The analyses given in Table V., most of which were made by C. H. Wang, exhibit the character of the coals. An interesting feature is the high content of phosphorus, and the importance which this has had in the native metallurgy of iron is discussed in the section devoted to that metal. Shansi also possesses considerable resources in bituminous and semi-anthracite coal, which is produced both to the east and west of Tai-yuan-fu and sold in considerable quantity in that city. Analyses are given in Table V.

* Now connected.—Ed.

TABLE V.—*Analyses of Shansi Coals.*

No.	Locality.	Moisture.	Volatile Hydrocarbon.	Fix d Carbon.	Ash.	Sulphur.	Phosphorus.	Analyst.	Sp. Gr.	Remarks.
		Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.			
1	Chuang-chuang-kou,	0.91	8.20	78.75	12.14	0.67	0.476	C. H. Wang.	....	Semi-anthracite, does not coke.
2	Hon-ho-kou	0.94	6.15	85.70	7.21	0.59	n. d.	C. H. Wang.	....	Hard dry anthracite.
3	Han-ho-kou	0.38	8.55	84.00	6.72	0.409	0.23	F. N. Lu.	1.38	
4	Tuan-chia-kou	0.76	6.44	79.10	13.66	0.683	1.80	F. N. Lu.	1.35-1.38	
5	Lao-hsien-shêng-kou,	0.66	4.49	89.50	5.46	0.509	2.53	F. N. Lu.	1.4	
6	Nan-t'ien-mêng	2.01	7.05	81.35	9.61	0.867	n. d.	F. N. Lu.	1.3-1.5	
7	Meng-tsen-chêng	0.33	4.39	89.25	6.03	0.405	2.15	F. N. Lu.	1.3 high	
8	Chuang-chuang-kou,	14.75	19.28	52.42	13.45	9.89)	n. d	F. N. Lu.	....	Coked in crucible, probably due to oxidation.
9	Chang-tsai-kou	0.50	14.20	75.89	9.41	0.258	n. d.	C. H. Wang.	....	Semi-bituminous, coked in crucible.
10	Tung-chia-chuang ...	1.73	10.72	84.22	3.33	1.150	n. d.	C. H. Wang.	....	Semi-anthracite, does not coke.
11	....	1.93	3.45	81.44	14.17	0.35	n. d.	....	....	Average of 6 analyses by Drake.[12]
12	....	2.91	(86.80)		9.88	0.41	n. d.	....	....	Average of 6 analyses by Shockley.[47]

Samples 1 to 8 were taken throughout the district (113° 30′ E., 38° N.); sample 9 from (112° 40′ E., 37° 55′ N.); and sample 10 from (112° 40′ E., 37° 50′ N.).

In Shensi, which adjoins Shansi on the west, extensive coal-fields are known to exist, and Richthofen,[44, 45] thought that the bituminous-fields to the west of Tai-yuan-fu were of equal extent and importance as the anthracite-fields to the east. This is possibly too optimistic

but they are certainly very great. I have estimated the production of this province as 500,000 tons, but this is problematical, as the area is so little known. The same remarks apply to Kansu, which adjoins Shensi on the west. I have, for this reason, omitted Mongolia from Table I., though it is known to possess coal-seams in those portions which adjoin Chihli and Shansi. Passing directly south, to Ssu-chuan, Kwei-chou, and Yunnan, our knowledge is in a similarly unsatisfactory state. Richthofen,[45] who only traversed the northeastern part of Ssu-chuan, says, in substance, that coal is very generally worked throughout the province, as the Mesozoic strata are extensively folded and are cut across by the rivers, thus conveniently exposing the seams. So far as I can learn, the coal here is not of as good quality as other deposits more favourably situated with respect to the larger markets, which, together with the difficulties of transportation on the Yangtze, restricts production to the amount required for local needs. A few years ago, a British company secured a concession at Wan-hsien (108° 30′ E., 31° 0′ N,) and installed modern machinery, but it has now been handed over to a native company and is worked by native methods, Baber,[1] Hosie,[18] Duclos,[13] LeClere,[25] and others have noted many places where coal is worked in Ssu-chuan. Duclos has discussed at some length the occurrence and methods of working coal in Ssu-chuan; his remarks are best summarized by a quotation from his report; "Le charbon se trouve presque partout dans le province, donnant lieu à de petites exploitations qui subviennent aux besoins locaux." LeClere,[25] who has a favourable opinion of the coal-resources of southwestern China, says that coal occurs at four horizons, from lower Palæozoic to Rhétic, and is widely distributed over a quadrilateral area bounded by 'Lao-Kay' (101° 31′E., 22° 30′N.), 'Yunnan-hsien' (100° 30′ E., 23° 0′ N.), 'Tchao-toung' (101° 31′ E., 27° 30′N.), and 'Kouei-Yang-hsien' (104° 20′ E., 26° 20′ N.). He thought that the field most favourable for exploration is that lying to the west of Mengtze (101° 0′ E., 22° 45′ N.). Duclos [13] mentions four places in Kwei-chou where coal is produced; 'Mao-py', 'Tchen-lin' (103° 15′ E. 26° 0′ N.), 'Choui-tang-pou', and Ma-lou-kio (102° 27′ E. 26° 58′ N.).

The anthracite-field of Shansi extends southward into Honan province and at Ching-hua-hsien, 113° 40′E., 35° 15′ N. approximately, the Peking Syndicate has several shafts equipped with modern machinery, in operation. This company has had a good many vicissitudes, but is now meeting with success; the production during 1910 is given as 357,205 tons. There is a good deal of production by native methods in this province.

The great southern coal-field lies to the east of the Hsiang river, in Hunan and Kiangsi provinces. The greater part of the field is in the former province, but the most important producer, the collieries of the Han-Yeh-P'ing Iron & Coal Co., are at P'ing-hsiang (113° 50′ E., 27° 30′ N.), in Kiangsi. This coal is a bituminous coking variety (with associated thin seams of anthracite), which contains 28 per cent. of ash as mined, but after washing and drying an average analysis furnished by the company gave:

	Per Cent.
Volatile hydrocarbons,	22.35
Fixed carbon,	68.90
Ash,	8.70
Sulphur,	0.10

It yields excellent coke, which supplies the blast-furnaces at Han-Yang and the general market; more than 107,000 tons having been produced in 1909. Further details can be found by consulting [47] and [48]. The production for 1910 is given as 610,000 tons. The coal-fields extend west and south from this point for a great distance, and Richthofen [45] says that southward the coal is anthracite and of better quality. Transportation is difficult, owing to the shallowness of the rivers; so development has lagged; but when the Canton-Hankow railway, now under construction, is in operation, this field, which I regard as only second in importance to the Shansi field, is likely to develop greatly. Some of the most important mineral regions in China lie to the west of the projected railway-line, and the transportation-facilities thus afforded should lead to a great increase in mineral production.

The coal-fields of Chekiang are of little importance. In Kwangtung and Kwangsi coal is mined at a number of places, but I have no personal knowledge of this area. My impression that these coal-deposits are worked because of their proximity to important centers of trade, rather than because of their superior quality, is not improbably correct,

Despite the importance of the coal-fields of China, it is impossible to afford more space to their discussion. Reference should be made to the papers quoted for further details. In conclusion, it should be said that the coal-fields of China are of great extent, the coal is generally of good quality and the fields are widely scattered, so that no parts of the country are far distant from the sources of supply. In extent and quality the coal-resources of the country compare favourably with those of the United States. As a rough comparison, it may be said that Chinese coals are slightly younger than those of North America, most of the fields being upper Carboniferous or Permian. In the north, Jurassic and Tertiary coals occur, but except for the Fushun field, are of little importance as yet. There has been a good deal of controversy over the exact age of these coals, but it is of little interest to mining engineers. Bituminous coking-coal is very common; coke made by native methods can be obtained almost anywhere in the country When made from washed coal, the resulting coke is of excellent quality, and will afford an abundant supply for the smelting-industries which are likely to develop. The anthracite is of excellent quality, but the bituminous is often friable, yielding an excessive proportion of fine coal. When worked on a large scale this can be washed and converted into coke. The Chinese custom is to make the dust into briquettes with clay as a binder, which are dried and burned. In recent years the number of mines equipped with modern machinery has become comparatively great, and the present supply amply meets the demand. The mines of the Fushun Co. and the Chinese Engineering & Mining Co. now chiefly supply the railway and shipping-trade of North China, because of the superior transportation-facilities which they enjoy. These two companies also send coal to the cities along the SE. coast, competing with Japanese coal. Coal-production throughout China exhibits a healthy and vigorous growth. The annual production of the country as shown in Table I., is estimated at 15,000,000 tons; but this amount is only approximate. The amounts given for Yunnan and Ssu-chuan, for example, should be designated as guesses rather than estimates, and the figures occasionally seen in statistical tables giving the production of the country to the nearest thousand tons are totally misleading in the false appearance of accuracy which they present.

III. Iron.

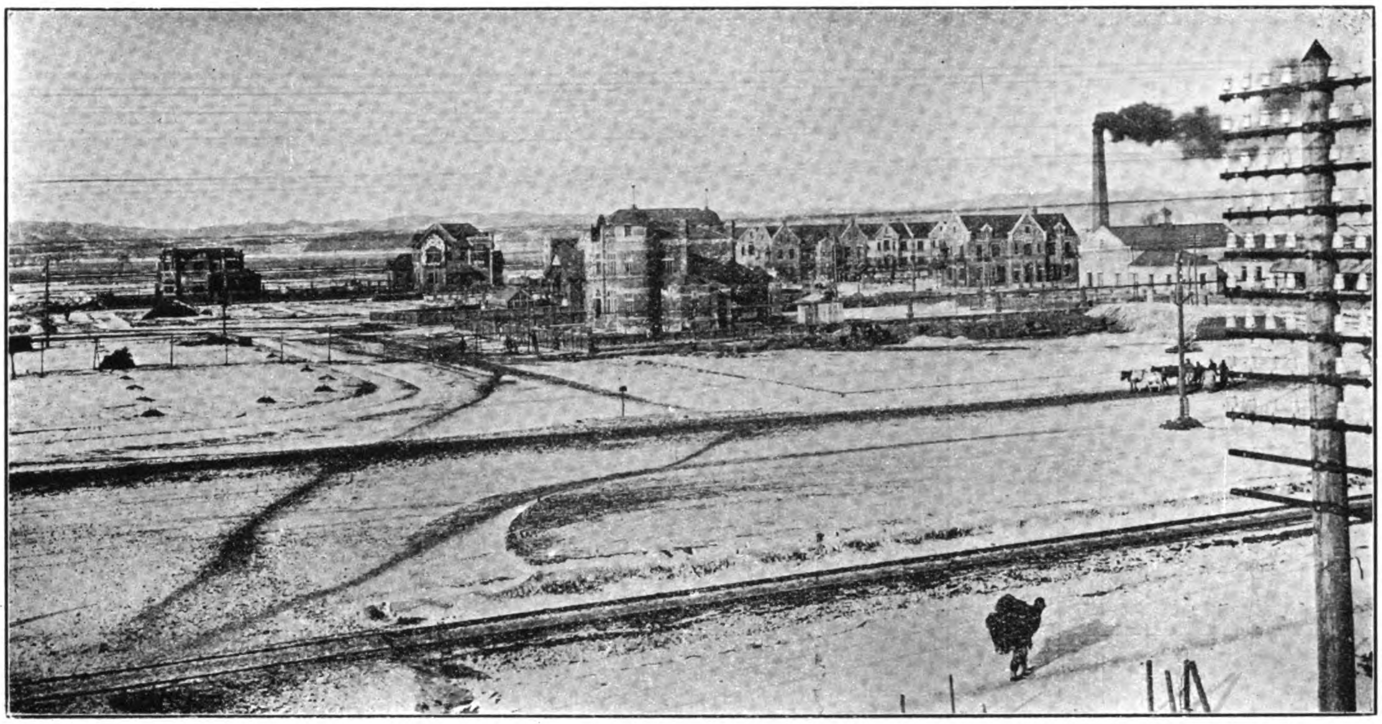
Iron is the second in importance of all the mineral resources of China, and the security of the future of China as a mineral-producing nation is easily appreciated, since it is founded upon an abundant supply of coal and iron, the two bases of industrial development. In the case of other minerals it may be inferred, without falling into serious error, that practically every occurrence of importance has been worked, to a slight extent at least, by native methods. But this is not true of iron-ore deposits. The great importance of the lack of transportation-facilities upon the development of mineral wealth has already been mentioned, and it is in the case of iron that its influence has been most marked. In the native method of iron-smelting such large quantities of coal are used that it is necessary to have both coal and iron-ore in close proximity in order to permit the development of a smelting industry, This condition obtains in several provinces, but most notably in Shansi, where it has been described by Richthofen, [44], [45], and Shockley.[47] But while these deposits are adapted to the native methods of working, they are not at all suited to modern methods, where a large supply of uniform quality and high iron-content is necessary. It is reasonably certain that such deposits exist in numerous places; but, except in the case of the Ta-yeh mine, to be described later, they have not yet been developed because the necessary supply of coal does not exist near-by. A sketch-map showing the iron-centers in China is given. A description of the deposit at Ta-yeh will be given, followed by a list of the principal localities throughout the country where iron-ore is known to occur. I will preface this by a description of the P'ing-t'ing-chou district in Shansi, the principal one in which iron is produced by native methods. The accounts of this by Richthofen have already been mentioned: what is here given, however, is based upon notes made during the winter of 1910. The analyses given of the raw materials and products have been made by my former students, C. F. and C. H. Wang and F. N. Lu.

The iron-ores of Shansi are limonite and hematite, occurring in shales and sandstones of Carboniferous age; the varieties of method of occurrence are so numerous that to attempt their description would require too much space. Usually they are in masses of no great size, commonly in or near a disturbed zone in the strata, or else in beds or flat veins, from a few inches to not more than 3 ft. thick, of limited extent. It follows, therefore, that no sufficient supply of uniform ore in enough quality can be obtained from the Shansi deposits, so far as yet explored, to form the basis of blast-furnace work on a large scale. More recently it has been reported that on the southern border of this district, in Honan province, a suitable deposit has been found, and it has been proposed to erect there another government iron-works, similar to the one described later. Two analyses of the ore from T'ai-yang, near Tze-chou-fu, as given by Shockley,[47] are shown in Table VI.

Table VI.—*Analyses of Iron-Ore from T'ai-Yang.*

	I.	II.
Fe	53.88	45.50
SiO_2	4.67	11.15
Al_2O_3	3.46	6.42
MnO_2	0.57	0.51
CaO	2.21	5.50
MgO	trace	0.25
P_2O_5	0.57	1.08
S	0.074	0.016
CO_2	9.37	2.70
H_2O	2.20	7.35
Analysts.	Edward Riley.	Pattinson and Stead.

The ore, mined through shallow round or rectangular shafts, is broken into small pieces and hand-sorted into several grades, which are sold to the smelting-plants. Here it is mixed with 50 per cent. of its volume of coal and packed into cylindrical crucibles, 5 in. in inner diameter, and usually 45 in. high, Fig. 10. From 250 to 275 of these crucibles are set upright in a rectangular furnace, about 12 by 6 by 4 ft. Air-space is secured at the bottom by a layer of broken crucibles, over which is placed a layer of coal; then the crucibles are set in place, with coal between them; the front side is closed, the whole is covered over with coal and allowed to burn by natural draft for three days. The crucibles are then removed and the contents taken out. This operation usually involves breaking the bottom part of the crucible, which now contains an irregular "bloom" of iron of very variable composition (Table VII.), irregular fragments of iron, earthy residues, and a certain amount of coke. The bloom is sold to the makers of wrought-iron, the small pieces of iron are sold to the makers of cast-iron, and the coke is used in the manufacture of crucibles. It should be noted that the product of this method of melting is not pig-iron, in the ordinary sense of the word, as it contains very little carbon, and is malleable. The bloom is worked into wrought-iron by heating in a wood fire and hammering until it



THE FUSHUN COLLIERY OF THE SOUTH MANCHURIA RAILWAY

is worked down into a rectangular ingot, which is then sold, and either manufactured locally into various objects and utensils, or shipped in the ingot form to all parts of the country. The small pieces of iron are mixed with coal and placed in crucibles, about 7 by 14 in., and from 50 to 80 of these are placed in a smaller furnace, blown by hand. When the iron is melted the covering of the furnace is removed, the crucibles are taken out, the contents of several crucibles are poured into one, and this is then poured into molds, which have previously been prepared with extraordinary skill. In this way various cooking-utensils, especially *kuo*, are cast, often of remarkable thinness, as the castings contain as much as from 5 to 7 per cent. of phosphorus, which has been taken up from the coal during the reduction and remelting.

Note in Table VII., sample No. 12, the high percentage of phosphorus in the cast-iron bar. It is not at all improbable that the high phosphorus-content of the Shansi coals, Table V., samples Nos. 5 and 7, has been the chief factor in the great development of the industry, as it has afforded an easy means of securing the high-phosphorus iron necessary in making thin castings. Formerly the iron-products of this locality found their way through the channels of trade to nearly all parts of the Empire. Now the trade in native iron exists chiefly in the interior, as foreign scrap-iron and steel, especially old horse-shoes, are imported in large quantities into all the treaty-ports; and because of their superior quality and low price tend to drive out the native product. The native industry, therefore, is steadily dwindling, though it will continue to exist until foreign cooking-utensils displace the high-phosphorus cast-iron *kuo*. Shockley [47] has called attention to the amount of decrease between the time of Richthofen's visit and his own. Table VIII. gives the production, as estimated by Shockley, of the chief districts of Shansi in 1901.

TABLE VIII.—*Annual Production of Native Iron in the Chief Districts of Shansi.*

	Tons
Yu-hsien,	4,500
P'ing-ting-chou	18,000
Yiu-ch'eng,	6,000
Kao-p'ing-hsien,	4,000
Tse-chou-fou,	13,333
Yang-ch'eng,	2,000
Ch'in-shui,	1,415
Tai-yuan-fu.	2,000
Total	51,248

VIEW OF FUSHUN

TABLE VII.—*Average Phosphorus- and Sulphur-Content of Native Pig-Iron P'ing-t'ing-chou, Shansi, China.*

Sample No.	Locality	Phosphorus	Sulphur	Remarks on Samples
		Per Cent.	Per Cent.	
1	Li-chia-chuang	1.7314	0.5489	Clean, malleable
2	T'ao-p'o	0.4671	0.1781	Dirty, malleable
3	Yang-chia-chuang	4.8400	0.4577	Rather clean, brittle
4	Nan-yao-kou... ...	2.6066	0.2486	Dirty, globular
5	Chien-mu-p'ing ...	0.8527	0.1254	Dirty, perous, brittle
6	San-ch'uan	0.6854	0.1365	Clean, porous, brittle
7	Yang-shu-kou ...	1.5075	0.6140	Dirty, porous, slightly malleable
8	San-tu	0.4645	0.4945	Dirty, porous, slightly malleable
9	I'ng-Ying	3.5700	0.6375	Clean, hard, massive
10	Ha'-ho-kou	3.7645	0.2999	Clean, hard
11	Wu-tu	0.7315	0.2155	Clean, malleable
12	Yang-chü-Hsien ...	6.9940	0.2196	From a cast-iron bar
	Average	2.3479	0.3480	

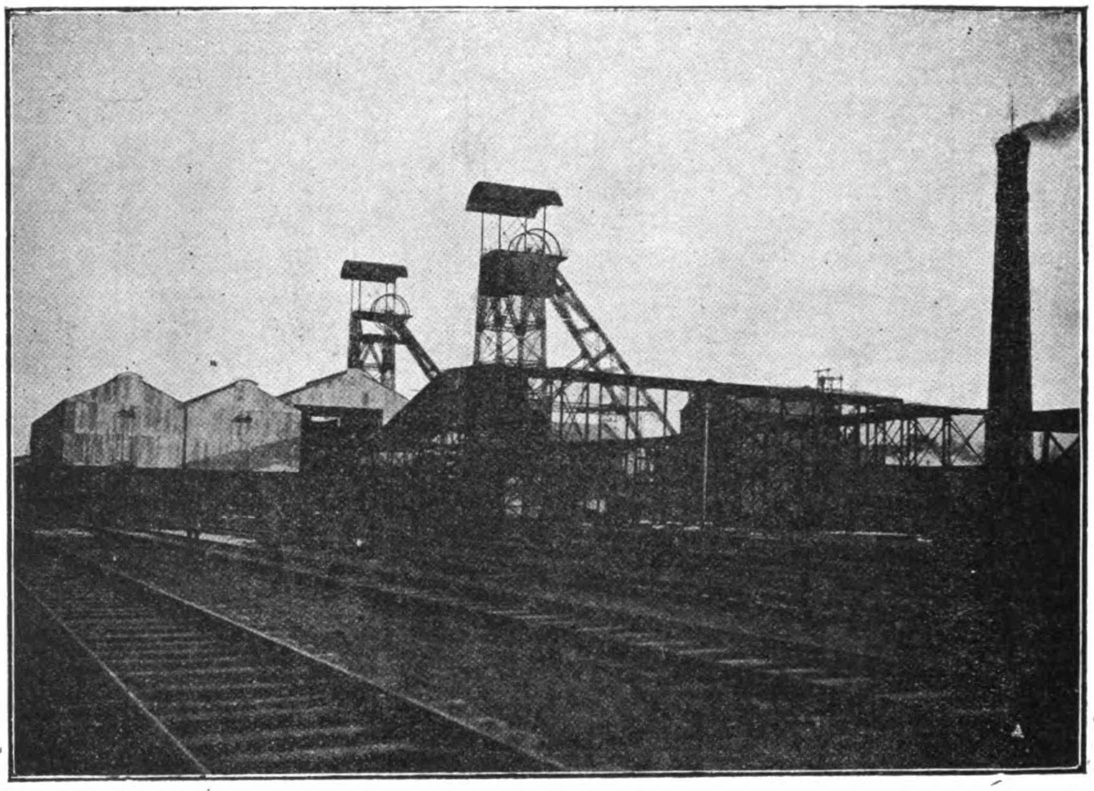
Analyses by Cheng-Fu-Wang.

The following notes of the only modern steel-works existing in China at present were made during a visit to its iron-mines and metallurgical plant during the summer of 1908.

The blast-furnace and steel-plant of the Han-Yeh-P'ing Iron & Coal Co. is situated at Hanyang, just across the Han river from Hankow, in Central China. Its iron-ores are mined at Ta-Yeh, about 50 miles S.W., and its coke is obtained from its colliery of P'ing-hsiang, in Kiang-si province, more than 300 miles distant. The relative, positions of the properties are shown on the sketch-map Page 57.

The iron-ores at Ta-Yeh occur about 15 miles west of the Yangtze river, and lie along the contact between a marble and an intrusive body of a dark gray syenitic rock. There is no direct evidence in the neighbourhood as to the age of the marble, but on lithological grounds it seems identical with the limestone occurring near Nanking, which Richthofen [45] has called the 'Sihia.' (He has translated the Chinese characters incorrectly; it is properly 'Hsi-hsieh.') Richthofen has suggested the age as Devonian, but the closely-associated coal in both localities makes it much more probable that it is rather to be regarded as Carboniferous, since the Devonian is generally very poorly developed in China. There is much doubt as to exact correlation of China fossil fauna with that of other countries, and in nearly all cases coals in China belong to the Carboniferous, or the immediately overlying series. If these two are identical, it would then appear that this limestone is a horizon for iron-ores in the Yangtze valley, as they are associated with it in notable amount near Nanking, as will be noticed later.

The ore is a good quality of hematite of about the following range of composition, furnished by the Han-Yeh-Ping Iron & Coal Co.:



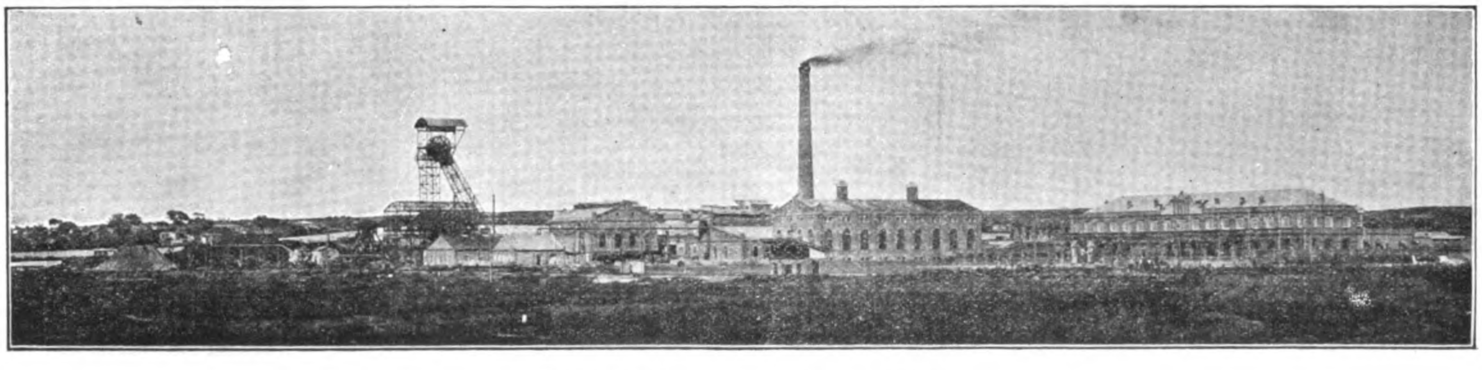
TOGO PIT FUSHUN COLLIERY, SOUTH MANCHURIA

Iron Ore, Ta-Yeh.

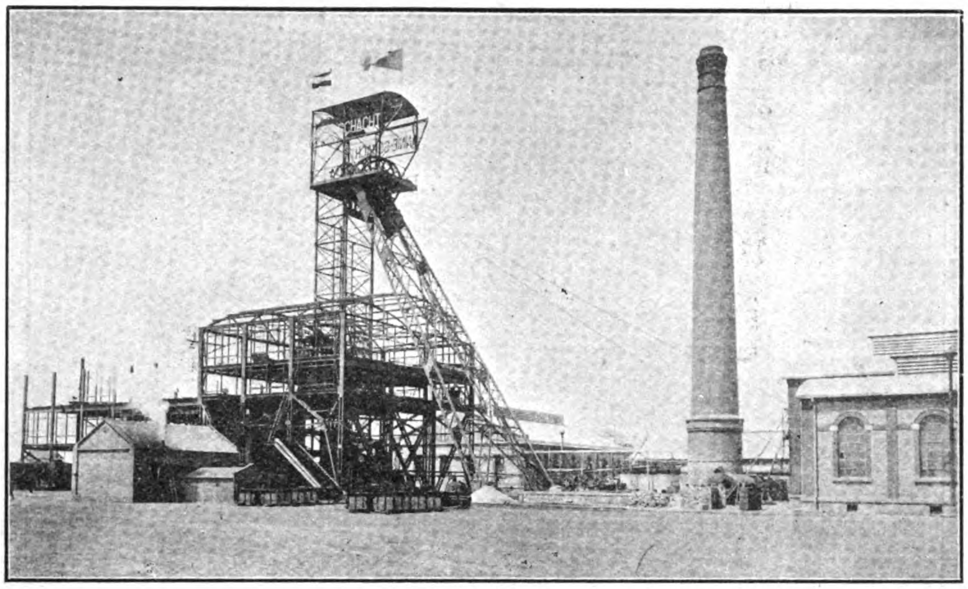
	Per Cent.
Fe	60 to 62
P	0.05 to 0.25
S	0.05 to 0.12
SiO_2	3 to 5
Al_2O_3	1 to 2
Mn	0.2 to 0.4
Cu	0.05 to 0.25

At one place it is slightly magnetic, apparently having been partly reduced to the magnetic oxide by the action of reducing solutions, which have deposited small amounts of copper and iron sulphides along the foot-wall. During the Ming dynasty, efforts were made to work this deposit as a copper-mine, but could scarcely have been very successful. The iron-ore is opened up over a length of more than 2 miles, but apparently is not continuous over that extent. The contact runs nearly east and west, and for considerable distances to each side of the present workings the ores can be traced. Where it is worked the ore-body is about 200 ft. thick and is nearly vertical, dipping slightly to the north. The syenite lies to the north of the marble, and a few miles farther north the marble again appears, iron-ore again being present along the contact. It would be entirely impossible to estimate the amount of ore available in this district, as in the workings only open-cuts are made, and the ore is nowhere blocked out in such a way that it can be accurately measured; however, the officers of the mining company believe that they have many millions of tons of good ore on their property, and there seems no reason to doubt this.

At the metallurgical works at Hanyang, two blast-furnaces, each of 100 tons daily capacity, are in operation, and a third unit of 250 tons capacity has just been completed. Three Siemens-Martin open-hearth furnaces are in operation, two are under construction, and five more are projected. The rolling-mill has a capacity of 800 tons per day; the larger part of it is devoted to rolling railway-material, as the greatest demand in China is for material of this nature. During 1909 there was produced 307,500 tons of iron-ore, of which a large part was exported to Japan and America, and the remainder smelted at Hanyang. Of the resulting pig-iron, 44,300 tons was sold as such, and the remainder converted into 28,500 tons of steel, chiefly steel rails; 3,600 tons of manganese-ore of good quality was produced in 1908 at P'ng-hsiang, in the province of Kiangsi. In several other places the company owns deposits of manganiferous limonite which contains about 20 per cent. of manganese, which can also be utilized if necessary. The



THE LANCHOW COAL MINES, CHIHLI



SHANTUNG MINING COMPANY: SHAFT AT FANGTZE

company has a contract with the Japanese government iron-works at Wakamatsu to supply them with ore of Bessemer grade, and has recently made a contract with the Western Steel Corporation to furnish it yearly with 36,000 tons of ore and 36,000 tons of basic pig-iron.

The occurrence of iron-ore throughout the Empire is given in the following list of the places where deposits of iron-ore are known to exist, beginning at the north.

In Manchuria quite an amount of iron is produced [19] by native methods at T'ieh-ling, 44 miles north of Mukden, the ore coming from an adjacent range of hills. Recent Japanese reports are to the effect that iron-ores containing about 50 per cent. of iron exist along the line of the Mukden-Antung railroad, and also at Sai-ma-chi, Tung-hua, and 'Puaijin.' The NE. part of the province is only sparsely settled, and no other deposits have yet been opened.

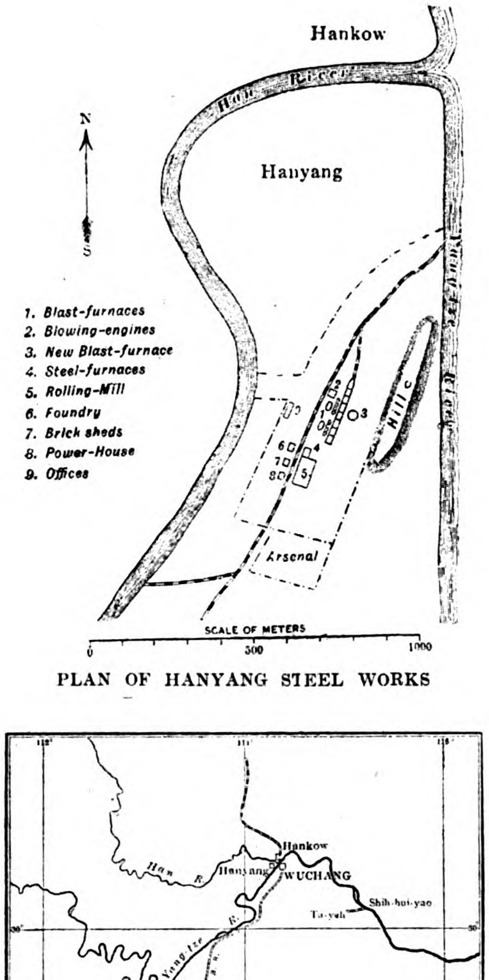
Practically nothing is known of the iron-resources of the vast extent of Mongolia. At present the lack of transportation removes them from consideration, but it is not unlikely that the Peking-Kalgan railroad will be extended to meet the Trans-Siberian road, and the coal- and iron-resources of this great area may have to be considered in the future.

The iron-ores of Shansi have already been described. Richthofen states that in Shensi the conditions as regards iron-ores are probably similar to those in Shansi, and assigns their lack of development to the character of the coal, which is not so suitable for the native methods of smelting. The fact that Shansi lies much nearer the markets for iron is also of importance, for where transportation is so expensive it would be impossible to ship across a producing district and compete with it, unless conditions were immensely more favourable in the more remote district. At any rate, Shensi must also be included as an area of which but little information is available at present, but which may become of importance in the future.

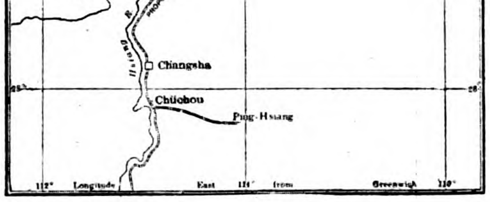
In the province of Chihli iron-ore occurs at several places, notably in the NE. part; but I do not regard any of these as likely to become the basis of a permanent industry.

Magnetite occurs in the province of Shantung, at P'ao-shan, about 50 *li* south of T'ung-chou. Not far from this locality, at 'King-kwo-shan,' different ore occurs, according to Williamson. [52] Near Chefoo specular ore occurs. It is not probable that the ores at these and numerous other places in the province offer much promise of success by development on a large scale, otherwise the German interests which have been so active in stimulating the growth of industry in the province would have undertaken their exploitation.

In Kiang-su province iron-ores are widely distributed, occurring chiefly in the region



PLAN OF HANYANG STEEL WORKS



MAP SHOWING RELATIVE POSITIONS OF THE HANYANG PROPERTIES

about Nanking in association with the limestone previously mentioned. Richthofen [45] seems to regard these of little promise because of the absence of coal of suitable quality in the neighbourhood. But when the distance to which iron-ores are transported in the United States is considered, and the fact that the ores in question are conveniently adjacent to the Yangtze river, it seems much more probable that these ores will be the next to be developed on a modern scale. The ore is probably of similar character to that ot Ta-yeh, previously described.

In the province of An-hwei the geological conditions are similar to those in Kiang-su and Hu-pei. A concession was granted to the London & China Syndicate to exploit copper-mines in this province. A few years since, when the Chinese government was about to cancel the concession, the company claimed to have developed ore of a value of more than $4,000,000. But I have been unable to secure any accurate information regarding this concession.

The iron-ores of Hu-pei province have already been described. A recent report made by some students sent out by that provincial government is to the effect that workable deposits exists at six localities.

The province of Ho-nan is largely alluvial plain. In the NW. part the conditions are similar to those existing in Shansi, and similar ores occur. These ores have not been the basis of a flourishing native industry, but some large deposits are known to occur, and it has recently been proposed to develop them by modern methods.

In Ssu-ch'uan iron-ore is widely distributed, and both Baber [1] and Hosie [18] mention numerous places in which it is the basis of a native industry: but neither of these authors gives enough details upon which to base a judgment as to the future of the industry.

In regard to Yun-nan and Kuei-chou information is even more meager. Numerous travellers and explorers agree that iron-ores are widely distributed throughout Yun-nan, but there is an entire absence of definite information. A similar statement may be made in regard to Kuei-chou. The native industry in these provinces must be in a flourishing state, judging by the exports of native material.

On the maps prepared by La Mission Lyonnaise the following places are marked as productive of iron: Ssu-chuan (105° 50′ E., 32° 10′ N.), (105° 40′ E., 29° 45′ N.), (104° 40′ E., 29° 15′ N.), (104° 50′ E., 29° 05′ N.), (104° 30′ E., 28° 48′ N.), (102° 05′ E., 29° 40′ N.). Kwei-chou (103° 0′ E., 26° 10′ N.), (102° 50′ E., 26° 50′ N.), (103° 30′ E., 27° 15′ N.), (104° 0′ E., 25° 20′ N.), (104° 50′ E., 29° 0′ N.), (104° 50′ E., 29° 20′ N.). (106° 05′ E., 27° 0′ N.). Yunnan (99° 45′ E., 24° 20′ N.). Kwangtung (109° 20′ E., 24° 40′ N.), (111° 05′ E., 24° 25′ N.), (111° 05′ E., 23° 50′ N.), (112 0′ E., 23° 45′ N.), (113° 30′ E., 23° 0′ N.). LeClere [25] says that iron-deposits are common in Yunnan, and are worked in places where the supply of charcoal is abundant. He also refers to the iron industry in the northeastern part of Kweichou. Duclos [13] reports what is almost incredible, that the Chinese smelt iron-ores in blast-furnaces in Ssu-chuan.

Iron-ore of inferior quality occurs in Hunan, but is only worked by the natives at Chin-chou, near the southern border of the province, where the quality is much better. Very probably exploratory surveys would disclose valuable deposits at points not convenient for the application of native methods.

The manganese-ores at P'ing-hsiang, in the province of Kiang-si, have already been mentioned. Manganiferous limonites also occur along the Yang-tze, in the NW. part of the province, and it is not improbable that ores occur in other parts of the province, but are not worked by the natives.

In Che-kiang province there is a native industry in an area extending from near Ning-po down into the province of Fu-kien. But as the ores consist of grains of hematite which are washed by hand from the sands of the streams, this district may be dismissed as of no future importance.

At 'An-Khoe,' in Fu-kien province, about 60 or 70 miles from Amoy, there is a large deposit of magnetite, estimated to contain 10,000,000 tons of ore, according to a report given to me by consular officials. It is favourably situated for working, but unfortunately the report says nothing as to the amount of titanium present in the ore.

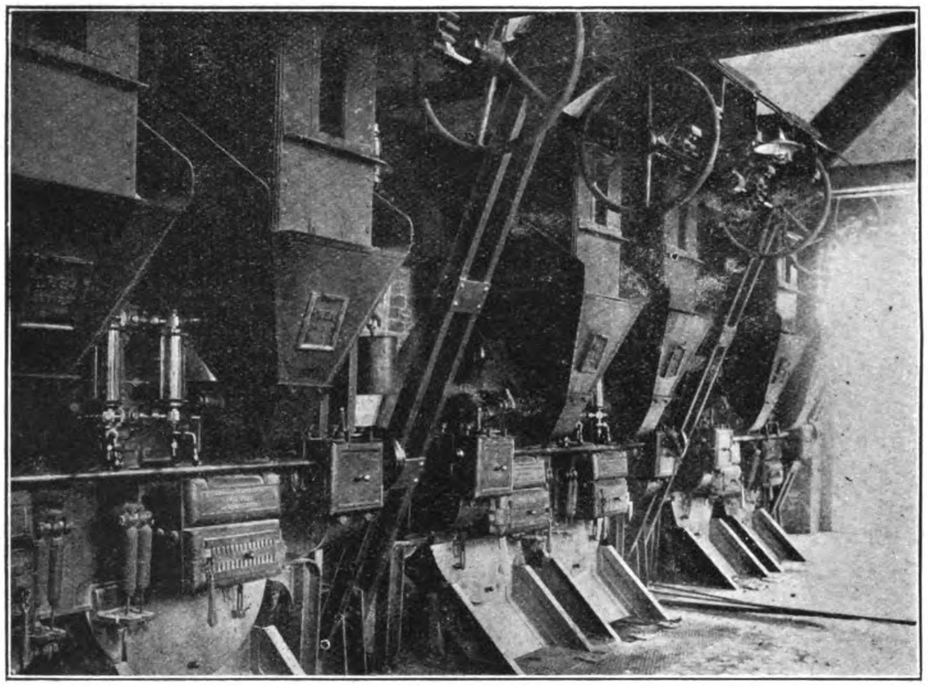
In Kuang-tung and Kuang-si provinces, iron-ore is produced in Hsin-hui-hsien, and is both produced and smelted at Hsin-hui-hsien and Yang-an-hsien; the annual production at the letter place amounting in value to $250,000 gold.

The cost per ton of production of iron-ore in the open-cut workings at Tayeh is approximately as follows:

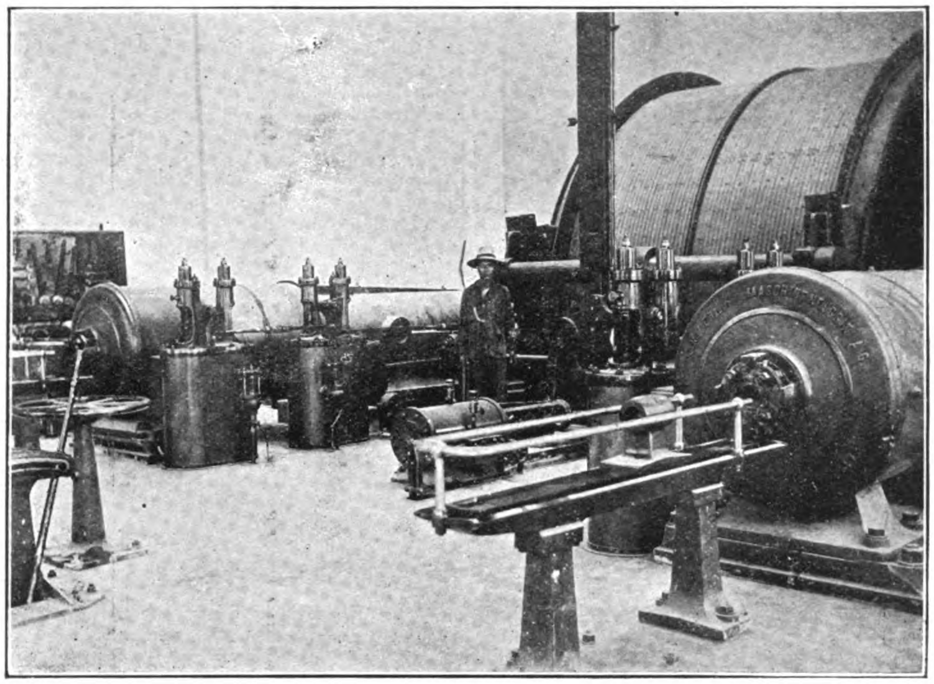
	Mexican Currency.
Stripping,	$0.08
Mining,	0.18
Tramming,	0.03
Powder, steel, etc.,	0.015
Superintendence,	0.06
Loading cars, freight to Yang-tze, etc.,	0.30
Total,	$0.665

From these data the probable cost of the ore delivered at the blast-furnace would amount to a little more than $1, Mex., per ton. The cost of limestone is about two-thirds of this: the cost of coke $15, Mex., and coal about $8, Mex. These low costs are largely due to the low cost of labour. Ordinary unskilled labour receives from 200 to 300 *cash* per day, or from $0.08 to $0.12 gold. Skilled labour receives from $5 to $25 gold per month, and the efficiency of this labour is remarkably high. As a result, pig-iron and steel can be produced at a very low cost: pig-iron from this plant is not only sold in Japan, but also in New York and San Francisco. But as there is a growing market for the present output in China, it is scarcely likely to become a serious competitor in other markets, at least for the present.

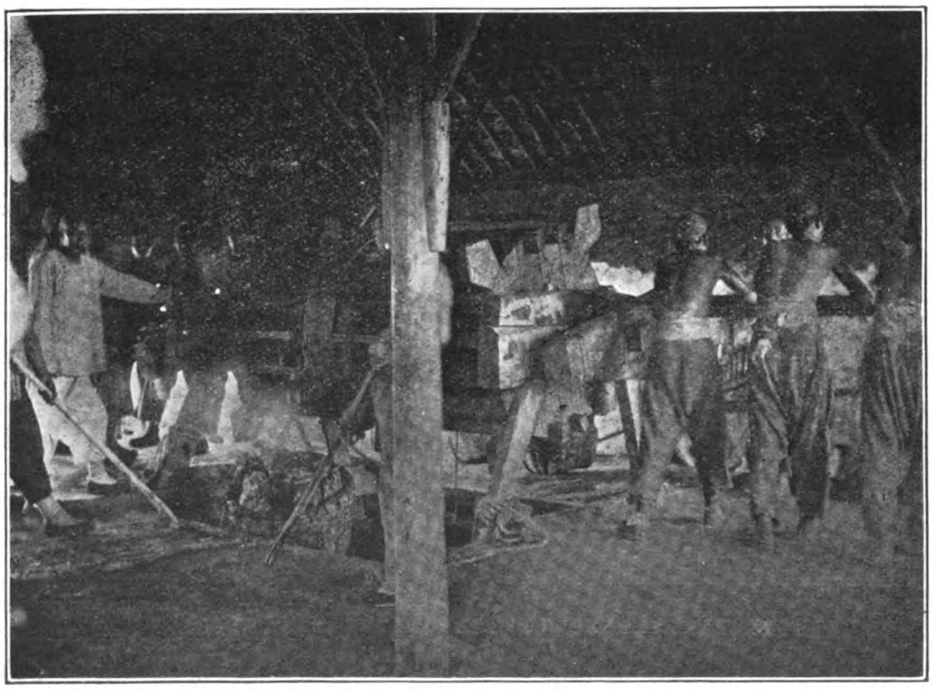
In conclusion, it may be said that, while our knowledge of the iron-resources of the Chinese country is still inadequate, yet the general features appear to be these: Iron-ores are widely distributed throughout the country from north to south. In many places these have been the source of a more or less considerable native industry, which is steadily waning, because of the unsatisfactory quality of the product. Owing to the peculiar features of the native methods it is not to be supposed that modern industries will necessarily develop in the same localities: on the contrary, the one modern plant is utilizing ores not previously worked by the natives, and this will not improbably be the policy of its successors. In this development of the iron and steel industry it is most probable that the Yangtze valley will have a leading place, as there seems good reason to believe that iron-ores of satisfactory quality, and in sufficient quantity, occur along a considerable portion of its length, and it also possesses the great commercial advantage of easy and cheap transportation, and a situation in the commercial center of the country. The extremely low cost of labour permits a low cost of production, making tariff for the protection of the industry entirely unnecessary. The low price of silver in recent years has operated to benefit China in a twofold manner: both by stimulating export trade and by discouraging imports. The resultant increase of wealth will give increased ability to meet the initial large expenditures necessary to develop modern plants. A large and increasing market is assured by the Imperial regulation that all materials required in the construction of railroads and other public works shall be purchased from the Chinese plants, so far as these are able to furnish them. As a result, it is to be expected that the iron and steel industry of China will have a large and healthy growth.



MECHANICAL STOKER INSTALLED IN THE BOILER HOUSE AT THE MACHIAKOU MINE



STEAM WINDING ENGINE INSTALLED AT THE MACHIAKOU MINE



HAND OPERATED WINDING GEAR UTILIZED AT THE CHENCHIALING MINE

IV. Gold.

Gold in China has unusual interest at this time, since the proposal to place the coinage of the country upon a gold basis is now receiving more serious consideration. The fact that the gold-production is so small has always acted as a strong deterrent to the establishing of a gold coinage. Since China produces but little of either gold or silver, and must purchase them with exports of merchandise, the advantage of buying silver at its present low price is apparent. At present silver and copper are the media of exchange; the former passing at an approximation to its bullion value, while the copper *t'ung-tz'erh* and *cash* are subject to daily fluctuations of value. As each province now issues coins, which pass only at a discount, or perhaps not at all, in other provinces, the transaction of business is subjected to a wholly unnecessary burden. The central government, having acquired control of the railways, will doubtless next proceed to complete its present shadowy control of banking, and a gold standard may be introduced, as large amounts of foreign capital are now invested in China, and interest payments are at present subject to sudden and extensive changes in the rate of exchange.

The absence of records of mineral production renders it difficult to obtain any knowledge of the gold-production of the country. The best approximation can be made from the customs-records of gold exported, since the amount used annually in the arts is but small. The export for 1908 was approximately $6,500,000; that for 1907 was $3,200,000. The occurrence of gold in China has been noted by Baber,[1] Garnier,[15] Duclos,[13] LeClere,[23] Jack,[21] Verschoyle,[49] Hoover,[16] Hosie,[18, 19] and others,[9, 14, 20, 26, 27, 28, 29, 33, 34, 35, 36, 39, 43, 44, 50, 51, 52, 54, 57]; but the most notable descriptions are by Hoover,[16] Hosie,[19] and Purlington.[30] The last has described at length the occurrences of alluvial gold in northern Manchuria, along the Amur, Sungari, Tumen, Urga, and Nonni rivers and their tributaries, and its recovery by primitive washing-methods. Gold also occurs in southern Manchuria, both in alluvial deposits and in narrow veins, frequently of the gash type. The Bureau of Mines of Manchuria has compiled a list of 10 localities where gold is worked in Fengtien province, and 40 others where it is known to occur.

Bogdanovitch[2] has published an excellent study of the deposits of the Liao-tung peninsula, dividing them into four classes: (1) existing stream-beds; (2) Pleistocene high-level gravels; (3) ancient valley alluvials; (4) marine placers. The northern area is of much greater importance. It will perhaps be safe to estimate that Manchuria produces from 75 to 80 per cent. of an annual output of from $5,000,000 to $7,000,000 for the whole country.

The gold-deposits of Chihli have been described by Hoover.[16] These are widely scattered, the most notable being veins at Chin-Chang-K'ou (119° 56' E., 42° 20' N.), and at Chuan-Shan-tze (119° 12' E., 42° 26' N.). In 1910 the former was producing at the rate of $150,000 per year, and the latter $15,000 annually. There are numerous placers throughout the province, and Hoover[16] estimated the total production for 1908 as $1,000,000. In Shantung similar conditions prevail, except that the deposits are not so abundant.

The best-known mine in China is that of Chou-Yuen, about 40 miles SW. of Chefoo, where a quartz vein from 40 to 90 ft. wide has been uncovered for more than a mile in length. Curle[8] reports that 200,000 tons of ore, worth $10 per ton, has been developed. The ore is about 40 per cent. free milling, and many years ago a chlorination-plant was in operation upon the tailings from the stamps. The mine has been closed for many years by government order; but there has been constant effort on the part of foreign companies to secure the concession, and recently the Governor of Shantung petitioned the Peking government to allow the Chinese owners to operate the mine, fearing lest it might otherwise be lost. The near-by mines at P'ing-tu are probably of considerable value. In spite of the government prohibition of mining a certain amount of work is carried on quietly, and Hoover[16] estimated the gold production of Shantung at $12,000 annually. With the few exceptions noted there seems little probability that deposits of sufficient size can be developed to justify the construction of modern milling-plants, the cost of labour being so low that primitive methods give cheaper working-costs. The tailings from the chlorination plant, mentioned above, were bought by the neighbouring farmers, who carried the material home, and, in the dull agricultural season, ground it in native mills and panned it. The deposits near Wei-hai-wei have been described by Verschoyle,[49] but are of little importance. In northern Manchuria, which has not been adequately prospected, large-scale workings may perhaps be developed; but throughout the rest of the country progress is likely to take the form of increase and improvement of native mines, efficient and inexpensive pumps being the most-needed equipment of native mines. Hansen has recently reported that between Lanchow, on the western border of Kansu, and the border of Thibet, numerous placer-workings exist, carrying as much as 2 g. of gold per cubic yard. A modern gold-milling plant is in course of erection at this place. Quartz veins also occur, containing from 1.5 to 2 oz. of gold per ton; but as these statements are apparently based upon the reports of natives, they must be received with caution. A recent Russian report is to the effect that on the areas of the Tushetvohanovsky and Tzentzenhanovsky concerns, Mongolia, between January 14 and September 2, 1911, the gold-production was 84.25 poods (1 pood of placer gold equals $0,000 approximately), as compared with 88 poods in the corresponding period of 1910.

Throughout the rest of the country quantities of gold are produced in many places, most of which are known to be of little importance. Ssu-chuan and Yunnan have been of much interest, since they are but little known. The upper waters of the Yang-tze are known as the Chin-sha, or 'golden sand,' but this does not necessarily indicate, as has been assumed, that especially rich alluvials exist along its course. Many travellers have mentioned the known or rumoured existence of gold-deposits in these two provinces, LeClere, Duclos, Baber, Hosie, Garnier, Jack, and Johnston, to name but a few, but definite information is only meager. At Mo-Lo, in Ssu-chuan (102° 05' E., 28° 15' N.), important quartz-deposits have been worked since 1880 by a combination of foreign and native methods. Small quantities of alluvial gold are reported from a great number of places, but in nearly every case the name of the district is given in such a way that identification is difficult or impossible. In giving the native names of little-known places, either the Chinese characters should be employed, or else the latitude and longitude should be given. In Yunnan the most notable mines are at Ta-lan-tung (101° 45' E., 23° 30' N.) at an elevation of 7,300 ft. (LeClere[25]). These quartz veins in Palæozoic rocks are worked by native methods, yielding some $60,000 per year. At Kin-Kiang, 60 miles from Ta-li-fu, rich conglomerate beds are worked by the natives. On the maps prepared by La Mission Lyonnaise the following places are marked as productive of gold: Ssu-chuan (99° 30' E., 30° 55' N.), (99° 45' E., 30° 40' N.), (99° 55' E., 30° 20' N.), (101° 50' E., 32° 40' N.), (101° 40' E., 32° 0' N.), (102° 15' E., 31° 40' N.), (102° 0' E., 29° 0' N.). Yunnan (98° 45' E., 23° 45' N.), (99° 50' E., 23° 20' N.). Numerous other localities are mentioned in the references given, and with the great recent increase of transportation-facilities in Yunnan it is not at all impossible that the gold-mining industry will greatly develop.

Gold is known to occur in Kansu, and there are quartz veins in the upper valley of the Han-ho, in Shensi. Along the lower reaches of the Han-ho, in Hupei, there is a small amount of gold-washing constantly carried on. The same is true of Fukien, where, in the Shao-wu district, 150 miles NW. of Foochow, valuable deposits are said to exist. In Anhwei mines were formerly worked, and deposits are known to exist in Hunan and Kuangsi, but they are not much worked. The mines in Kuangtung are said to be valuable; but in all these cases, it is probable that the deposits are limited in extent and of no great richness. It may be said, in conclusion, that with the exception of Manchuria and the SW. provinces of China (Yunnan, and Ssu-chuan), the gold-mining industry gives but little promise of growth. In the districts mentioned the introduction of modern pumping-machinery and the removal of the restrictions which the authorities and superstition have placed upon the industry are likely to lead to a considerable development.

V. Silver.

Silver is of great interest in China, since it is the chief medium of exchange. But the domestic production of silver is small, and China is, accordingly, a heavy buyer of the metal. An interesting subject for speculation is found in the source of supply of this metal during the period when China maintained but little communication with the outside world. About the time of the beginning of the Christian era there was a great deal of traffic with the countries on the SW. border, where the mining and smelting of argentiferous galena seems to have been a considerable industry. The best-known silver-mines are those in the northern part of Chihli province, near Jehol. At the time when Li Hung-Chang was viceroy, foreign engineers were employed in their exploitation. Woo,[56] who has described the native methods of mining and smelting these silver-lead ores, which occur as veins in quartz-porphyry associated with Palæozoic sediments, says that the lack of success of the foreign enterprise was due to the high cost of the coke used and to the unsuitable character of the milling-machinery employed. The general and probably correct impression is that these veins are too limited in extent and too irregular in character to allow of their being worked with a profit upon a larger scale than that employed by the natives. The production in 1903 was estimated,[55, 16] at from 80,000 to 100,000 oz. per year. In the mountains to the west of the line of the Peking-Hankow railroad numerous small occurrences are known, but the production is probably insignificant. References to the occurrence of silver-ores in nearly every province may be found, but do not seem to warrant much attention. Duclos[13] mentions numerous places in Yunnan where silver is produced, being usually associated with lead and zinc. The production at Pei-cha-po he estimated as 10,000 oz., and says that small amounts are produced at 'Koung-chan,' 'Fou-lay-tchang,' 'Siao-in-tchang,' 'Tchou-tsin-tchang,' 'Sin-pao-tong,' 'Ta-lang-tchang,' 'Tchen-pien-tchang,' 'Mo-lay-tchang,' and 'Sin-tchang,' in Yunnan. At Tsai-tse-chang in Kweichou, silver is obtained from an argentiferous galena. At 'Mou-pin,' in Ssuchuan, an argentiferous galena containing a little gold occurs: silver is also found toward the north of the province, at 'Fe-tsoa-pa' and 'Hou-koua-tou.'

On the maps prepared by La Mission Lyonnaise the following places are marked as productive of silver: Ssu-chuan (101° 45' E., 32° 10' N.). Kweichou (104° 20' E., 25° 12' N.), (104° 35' E., 25° 05' N.), (104° 15' E., 28° 10' N.). Yunnan (98° 45' E., 23° 45' N.), (99° 5' E., 23° 20' N.), (101° 0' E., 26° 30' N.). Kwangsi (106° 55' E., 23° 0' N.), (107° 50' E., 21° 30' N.). Kwangtung (108° 20' E., 21° 40' N.), (109° 45' E., 22° 20' N.), (110° 50' E., 25° 10' N.), (111° 0' E., 24° 50' N.), (111° 05' E., 22° 20' N.), (112° 15' E., 22° 50' N.), (114° 50' E., 23° 25' N.), (114° 05' E., 24° 15' N.). A Chinese company is now mining silver at Kwei-Hsien, in Kwangsi. The Jun Wah Sut Yip Co. was organized a few years ago with native capital to develop silver and other mines in Kwangsi, and is carrying on extensive exploration and development-work. Several foreign companies have attempted the development of silver-mines in southern China, but without much success. It must be admitted that, on the whole, silver-mining in China is of no great importance.

VI. Copper.

Copper has always been an important metal in China, brass and bronze, used for objects of use and adornment and as media of exchange, having played a prominent part in the national

life from the earliest times. But in the case of copper, tin, nickel, zinc, and lead, the discussion of the metals separately offers difficulties, since the ores are associated and are often smelted together, giving rise to natural alloys. By far the most important supply of these metals is derived from the southwest. Yunnan is the most important, but copper also occurs in the neighbouring regions. Duclos [13] gives a long list of places where copper is produced in Yunnan, and describes in some detail the work at San-Kia-Chang (99° 35′ E., 24° 40′ N.), where he estimated a yearly production of 42 tons. Le Clere [25] has summarized as follows:

"The total production obtained by reduction with charcoal was, in the 17th century, at least 6,000 tons, but has decreased to from 1,000 to 1,[illegible]00 tons. The decrease is not due to the impoverishment of the deposits, but to the disappearance of the forests, the scarcity of fuel permitting only the exploitation of deposits of unusual richness at the places most favourably situated in respect to transportation. The copper minerals are various. Phillipsite, cantonite, and more rarely cupriferous pyrite, are found in veins in the Carboniferous schists, but are almost abandoned. Sheets of cuprite with barite, and of native copper, intercalated in porphyrite, are highly esteemed, but the lack of explosives often makes it impossible to work them. Sandstones impregnated with copper carbonate are often found in the Trias. The principal deposits are in Triassic limestones, the network of veins have been converted into carbonates, with only a trace of pyrite. The principal mining centers are; (1) 'Toung-tchouan' (101° 0′ E., 26° 30′ N.), the mines in Ssu-chuan, near the Blue river are connected with these; (2) 'Oui-si,' near Li-Kiang (97° 15′ E., 27° 15′ N.); (3) the neighbourhood of 'Ouei-ning' (102° 15′ E., 26° 45′ N.) in Kweichou produces zinc and lead principally, and is directly governed by the mining official of Yunnan-hsien. The works will not take ores of lower grade than will give a smelting mixture of from 20 to 30 per cent. of copper; the latter is more common. This richness is obtained by careful handsorting at the mines. The ores lower in grade than 15 per cent. are piled up and form large dumps. The old slag-dumps are common near the old smelting centers and contain about 3 per cent. of copper. These facts demonstrate that Yunnan has extremely large resources of copper minerals, especially in the parts not workable by native methods."

The present chief source of supply from Ssu-chuan, according to Fox, [58] is at Hwei-li-chan, though an important mine exists at Pai-shui-ho.

Copper occurs in many other parts of China. While in Kiangsi in 1908, the local officials told me of a large copper-mine at Chang-pai-ling in the west-central part, which had recently been extensively developed, but was not successful. Clark [4] has described the copper-ore at Lao-Pao-chi in Anhwei; this is probably the area which was subsequently granted as a concession to Sir Lister Kaye. Considerable work was done upon this concession by the English company, but without conspicuous success, and in 1910, the concession was surrendered. Clark [4] also describes the production of copper by native methods near Jehol (118° E., 40° N.), and I have seen unimportant native workings in many other places. C. H. Hansen, who has recently been engaged in the work of constructing a 50-ton copper-smelting plant under government auspices at Yaokai, 70 miles west of Lan-chow, on the western border of Kansu, says that there are numerous mines within a radius of 80 miles from that point.

The mining of copper has always been rigorously under the control of the government, probably because of the importance of the metal as a medium of exchange. The native supply has not been equal to the demand recently, and considerable amounts are imported, chiefly from Japan.

VII. Nickel.

Nickel is of much technical interest because of the ingenious way the Chinese have of smelting mixtures of nickeliferous copper-ores with tin, lead, and zinc-ores, forming the alloy "pai-t'ung," or "pakfong," as it is called in southern China. This is a kind of German silver, which is extensively used in the manufacture of candlesticks and other household objects. Nickel is never produced separately, and the entire supply is apparently drawn from southwestern China, where in Yunnan (at 100° 20′ E., 26° 50′ N.), and in Ssu-chuan (100° 20′ E., 26° 45′ N.), Duclos [13] has noted the occurrence of nickeliferous copper-ores.

VIII. Tin.

China is an important producer of tin, furnishing at present about 5 per cent. of the total production of the world. A certain amount of the product comes in native boats down the Yuen and Hsiang rivers, probably originating at some point in Kweichou. Kwangtung also produces a notable amount, which is exported through Wuchow. On the maps prepared by La Mission Lyonnaise the following places in Kwangsi and Kwangtung are marked as productive of tin: (105° 10′ E., 24° 12′ N.), (110° 15′ E., 24° 45′ N.), (110° 45′ E., 32° 15′ N.), (112° 0′ E., 23° 30′ N.), (112° 45′ E., 22° 50′ N.), (114° 10′ E., 23° 40′ N.). There are also deposits in Fukien, and a small amount is shipped from Foochow. But by far the larger part of the production comes from the well-known mines at Ko-ch'iu-ch'iang (100° 59′ E., 23° 20′ N.), in Meng-tze-hsien, Yunnan. Here the deposits, which LeClere [25] says "ne sont nullement alluvionnels: leur origéne filonienne est des plus evidentes," are scattered over an area 25 miles long and 20 miles broad, and 30,000 workers are engaged in mining and smelting the product of 150 miles. The workings are both surface and underground and only native methods are employed. Collins, [6] Duclos, [13] and LeClere, [25] have described these deposits in detail. Theoretically the deposits belong to the central government, which, according to the mining-regulations, exacts a royalty of 25 per cent., but the amount actually paid is somewhere between 12.5 and 18 per cent. The reports as to the production of these mines do not agree, but the customs return for 1909 was 4,700 tons, corresponding to about 90 per cent. of the total production for the country. The crude tin, in slabs, each weighing 74 lb., is exported to Hongkong, where it is refined. A large part of the tin was formely shipped down the Yang-tze and West rivers, but now it is shipped over the French railroad. Recent newspaper reports are to the effect that efficient smelting and mining-machinery is to be installed, about $1,200,000 having been subscribed for the purpose, and the erection of a slag-cleaning plant has been proposed. It is not unlikely, therefore, that the production of tin in China will considerably increase in the near future.

IX. Lead.

There is a considerable demand for lead in China, which is largely met by imports, 10,707 metric tons of pig-lead having been imported in 1908. The domestic production is not inconsiderable, lead-ores occurring in 8 of the 18 provinces; Kweichou, Ssu-chuan, and Yunnan are the most important; but about 1,500 tons of ore were derived from Hengchou and Yangchou prefectures, in Hunan province, in 1908. The larger part of this is exported to Great Britain and Belgium, but considerable quantities are smelted at the works of Carlowitz & Co. at Wu-chang. About 350 tons of pig-lead was brought down the Yangtze through I-chang in 1907, and 300 tons in 1909. A good deal of lead-ore comes down the Yuen and Hsiang rivers, both from Hunan and Kweichou. Duclos [13] has described the production of lead at 'Tcha-tze-tchang' (102° 50′ E., 26° 45′ N.), in Kweichou, and notes its occurrence at (102° 40′ E., 26° 30′ N.). In Yunnan the mines contain mixed ores of lead, zinc, copper, and silver. In the neighbourhood of 101° 0′ E., 26° 30′ N., at 'Kong-Chan-tchang' 1,450,000 lb. of lead is produced, at 'Pe-cha-po', 700,000 lb. of lead, at 'Koung-chau' the lead produced is cupelled for silver. Near 102° 20′ E., 26° 45′ N. there is a considerable production, both of lead and zinc. In many places argentiferous lead-ores are worked (see "Silver"), the bullion being cupelled; the resulting litharge often being thrown away. LeClere [25] estimated the annual production in southwestern China at around 3,000 tons. The lead-ores of Kwangtung and Kwangsi are mentioned under "Silver." On the maps prepared by La Mission Lyonnaise the following points in Kwangtung are marked as productive of lead: (109° 50′ E., 21° 58′ N.), (110° 15′ E., 23° 57′ N.) (114° 05′ E., 23° 58′ N.). The native methods of metallurgy are so imperfect that it is not improbable that in many cases deposits exist which could be worked by modern methods. But, as mentioned under Silver," it has not infrequently been found that the veins are too narrow and irregular to yield a profit when exploited on a large scale.

X. Zinc.

The whole domestic supply of zinc in China is derived from the SW. provinces, chiefly Kweichou. Duclos [13] has described the native metallurgical methods followed at 'Ma-lou-kio' (102° 50′ E., 26° 45′ and mentions the occurrence of zinc in Yunnan at (102° 20′ E., 26° 45′ N.) and (101° 40′ E., 25° 30′ N.). LeClerc [25] says that the workings are only superficial, and that the distillation-methods are imperfect that much ore which could be utilized by modern method has been discarded. He estimated the annual production at about 2,500 tons. The spelter from Kweichou, which I have seen, was obviously impure, but it is used in the provincial mints in making brass coins, without any attempt at refining. Large quantities of zinc-ore are produced in Hêng-chou and Yang-chou prefectures, Hunan, and exported to Belgium and Holland. The export for 1908 was more than 15,000 tons, but for 1909 was very small.

XI. Antimony.

China possesses the distinction of being first in the production of this metal. The condition of the industry has been changing rapidly of recent years. My notes were made on a visit to the chief center of production in 1908. The ore comes from a number of places to NW. of T'ung-t'ing lake in Hunan, I-yang being the chief center, (110° E., 29° N., approximately). It is carefully hand-sorted at the mines, and is brought in native boats to Changsha (112° 45′ E., 28° 15′ N.), where it is liquated in pots about 15 in. in diameter. The methods were entirely Chinese at that time, but I understand that furnaces of modern construction have since been installed. The regulus is sent to Hankow, and so much as desired is converted into metal. The residues have been exported to France, Germany, and the Netherlands for further treatment; more recently large quantities have been sent to the United States. Carlowitz & Co., who operate a smelter at Hankow, are also engaged in the work of smelting and refining both antimony and lead, but as strict secrecy is observed, details are not obtainable. The production for 1907 from this district in Hunan, according to customs returns, was 3,057 tons of regulus and 14,810 tons of ore. In 1908 the production of regulus increased to more than 8,000 tons, and the ore-shipments decreased to less than 2,000 tons. The native company which operates the smelter has trained metallurgists in its employ, and the industry is likely to further increase in importance.

Antimony also occurs in Kiangsi, Kweichou, and Ssu-chuan, but Kwangtung is the next most important province after Hunan. Recently a smelter under government auspices was established at Wuchou (111° 30′ E., 23° 30′ N.), but was not a success, and has since been closed. A more extended discussion can be found in the *Mineral Industry* for 1908 and 1909, and in the volume *Antimony*, by C. Y. Wang (London, 1909).

XII. Quicksilver.

Quicksilver has a steady demand in China, most of the metal being used in the production of vermilion, which enjoys high favour as a pigment, a less important use being in gilding by the Chinese method. The native production fluctuates greatly, the amount reported by the customs authorities being, 30 tons in 1907, and 65 tons in 1908. It is impossible to determine what relation exists between the total amount produced and that reported by the customs. Most of the demand is supplied by imports, largely from California. The occurrence of quicksilver is reported from many parts of the country but the deposits in the province of Kuei-chou are, apparently, the only ones of commercial importance. As I have not visited these districts, my information is entirely derived from published statements. Duclos [13] has noted several places in Kweichou where quicksilver is produced; 'Oa-tchouan' (105° 50′ E., 28° 30′ N.), Pei-ma-t'ong (104° 15′ E., 26° 48′ N.), Lan-mou-chang (103° 15′ E., 25° 28′ N.) and Yang-li (104° 20′ E., 15° 0′ N.) are the most important. He estimated the production at Pei-ma-t'ong as 6,500 lb. per year, and says that

at Yang-li there is "*une enorme exploitation.*" He also mentions the occurrence of quicksilver in Yunnan (101° 10' E., 23° 30' N.). LeClere[25] was not favourably impressed by the mercury-deposits, and remarks, accurately enough, that the native methods of work can treat ore of quite as low grade as would be profitable by foreign methods. Brelich[3] says that the deposits at Wan Shan Chang, in Toon Yen prefecture, are the largest and most extensively worked in Kuei-chou. They occur in nearly horizontal beds of magnesian limestone: (1) impregnating well-defined beds; (2) along joints and planes of stratification; (3) in isolated bunches and vugs; (4) irregularly disseminated. The ore is hand-sorted and retorted in native furnaces. Brelich says the miners work for daily wage, which is unusual. The Anglo-French Quicksilver & Mining Co. began work at Kwei-yang in 1899, with a capital of £310,000, operating the Wen Shan Chiang mines, which are 12 miles north of the Yuen river. These are apparently the mines which Brelich describes. The area of the concession was 4 sq. miles Two 12-ton Granitza furnaces were constructed, and the production from 1899 to the end of 1902 was 32,500 lb. of quicksilver and 500 lb. of cinnabar. The company has had a somewhat checkered career, and little progress is now being made.

XIII. Arsenic.

Arsenic is of no little importance in China, but detailed accurate information regarding its occurrence and production is not obtainable. According to the customs returns, 5,000 tons was produced in 1908, but only 400 tons in 1909. Apparently the ore occurs in or near the principal antimony district (111° E., 29° N.), since the product passes through the same custom-house. About 700 tons of arsenic-ore from China was imported into Germany in 1908. A recent French report estimates the annual production of orpiment and realgar in Yunnan at 600 tons. This comes from near Chao-chou and Meng-hua, in Tali prefecture.

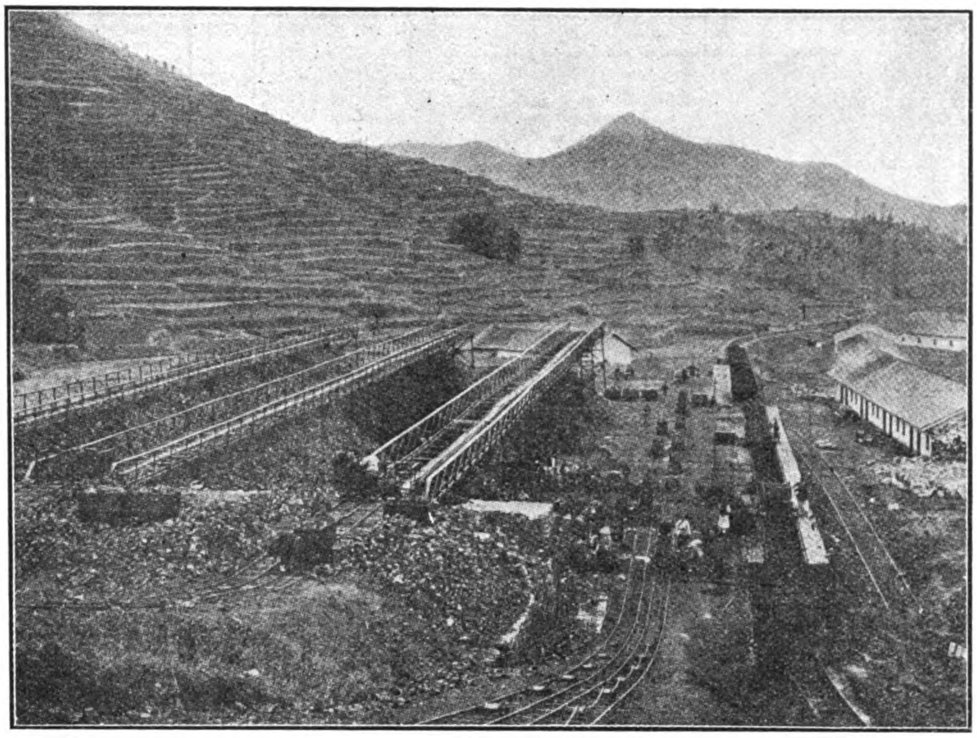
XIV. Petroleum.

The most notable petroleum-producing district is in Ssu-chuan, where, according to Coldre,[5] there are in the neighbourhood of Yun-hsien (102° 10' E., 29° 38' N.) and Fu-chuan (102° 43' E., 29° 27' N.) from 30 to 40 wells, from 1,000 to 3,500 ft. deep, in which petroleum occurs associated with gas and brine. The gas is employed in evaporating the brine, and the petroleum, which varies from '*blanc de petit lait*' to '*noir*,' is burned in crude lamps without any attempt at refining. Duclos[11] describes the wells at 'Tse-liou-tsin,' which is between Yun-hsien and Fu-chuan, nearer the latter, giving the number as about 150; but probably this refers to the total number rather than those which actually produce petroleum. But neither gives any estimate of the amount of actual production. Richard[43] refers to the occurrence of petroleum in Kansu, but does not give the locality. Recent press reports are to the effect that petroleum has been found near the Kanchou coal mine, in Kansu, but no definite information is available.

A field that is of present importance occurs near Yen-chang (110° 0' E., 36° 30' N.), in Shensi. A native company has been at work there for some years, has recently constructed a refinery, and is now selling oil throughout Shensi in active competition with the foreign product. I have been unable to obtain reliable detailed information regarding this field, but it is probably of a great deal of importance, since it is rumoured that the company is considering the construction of a light railway from the wells to Singan-fu, 200 miles distant. Apparently, petroleum occurs only in the western and SW. parts of the Empire, but in these places a considerable native industry is likely to develop when the areas are provided with adequate transportation-facilities.

In concluding this paper, it should be added that the development of the mineral resources of the Chinese country would be greatly aided by the creation of a country Geological Survey. The nucleus of such an organization already exists in the many Chinese geologists and engineers who have been trained abroad, and with proper organization and sufficient funds, this important and necessary work would redound to the immense benefit of the mineral industry.

[Bibliography will be found on page 99.—Ed.]



LOADING PLANT AT TA-SHIH-MEN, TAYEH IRON MINES

THE LOCOMOTIVE WORKS OF HENSCHEL & SOHN AT CASSEL.

The Locomotive and Machinery Works of Henschel and Sohn at Cassel (Germany) were founded in the year 1817 by Anton Henschel, Hessian Chief Mining Engineer, and at first constructed Steam Boilers, Pumps, Turbines (Henschel Turbines) Steam Engines, Blast Engines, Portable Steam Engines and Iron Structures of every description. Several of their design proved specially successful, and gained the firm in its earliest days a good reputation.

The first Locomotive was built in the year 1848, since when the attention of the works has been turned more and more to the construction of locomotives. The 7,000th engine was completed in 1905, the 8,000th in 1907, and the 9,000th engine in 1908.

From their foundation, the Works have remained in the possession of the Henschel family. They have passed down from father to son for four generations. The present proprietor is Mr. Karl Henschel, who has largely extended and modernised the workshops.

With a capacity of more than 700 locomotives per annum the Henschel Locomotives Works are the largest of their kind in Europe.

The number of workmen and officials amounts to 6,500.

Locomotives of all sizes and gauges are built, viz: for main and branch Lines, Tramways, Colonial, Industrial and Portable Railways, as well as for Contractors; also Crane Locomotives for both shunting and unloading Waggons, Locomotives without Firebox, Electric Locomotives, Rotary Snow Ploughs and Steam Motor Cars on special designs.

Those types of Engines that are frequently required are kept in stock or can be supplied at very short notice.

Spare parts for Locomotives, such as Boilers, Fireboxes, Flanged Boiler Plates, Steam Cylinders, Wheels and Axles complete, Tyres and so on can also be promptly delivered.

As a speciality the Works construct "Kettler" Nut Presses, which work without any waste of material. Henschel and Sohn are the largest suppliers of Locomotives to the Prussian State Railways, and their Engines have been exported in considerable numbers to Russia, Italy, France, Roumania, Servia, Denmark, Turkey, Egypt, the Argentine Republic, Brazil, Chili, Mexico, Japan, China and to other countries.

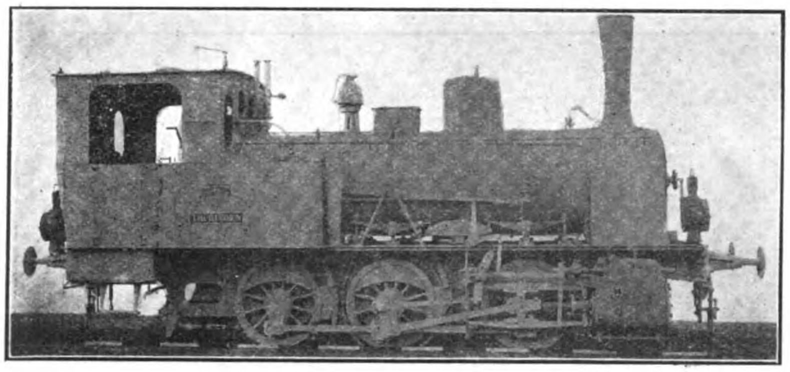
Numerous Locomotives have also been supplied to German and other Colonies in Africa and Asia. The majority of these Engines represent types created by the firm, and are specially adapted to the conditions in those countries, where they have given great satisfaction.

The firm employs a staff of over 150 skilled engineers and draftsmen, who are ready at all times to prepare new designs of Locomotives. Henschel and Sohn do not, however, confine themselves to the construction of Locomotives of their own special types, but build to any design and specification that may be submitted to them.

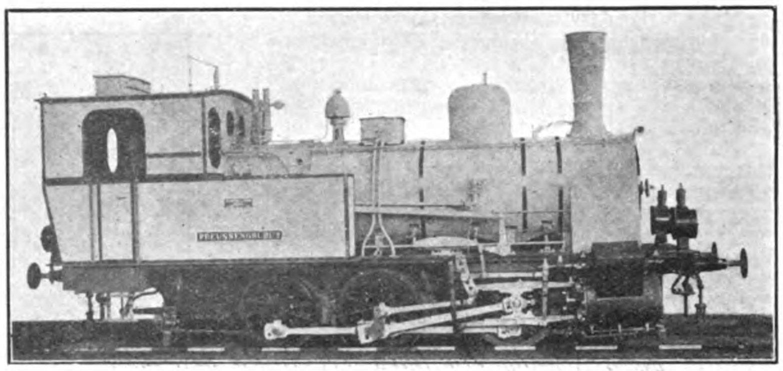
The Engines built by the firm are preferred by many purchasers on account of their practical design, suitability to the conditions of permanent way, and extremely solid and careful workmanship, in consequence of which great durability and a very small cost of maintenance is guaranteed. The finish of the boilers, and the arrangement of the steam distribution in particular are considered perfect and ensure the most economical and complete combustion of the fuel.

The Workshops at Cassel cover two sites, situated in different quarters of the town, but connected with each other by rail. The Shops are supplied with power and light by two Electric Power Stations with an aggregate of 5000 HP. 400 Electromotors drive the Machine Tools, 40 Travelling Cranes, 60 Turning Cranes, 20 Elevators, 4 Traversers and 20 Turntables. The Boiler Shop is equipped with 2 hydraulic flanging presses, 8 hydraulic and 2 electric rivetting machines, partly stationary, partly portable. The Boiler and Erecting Shops are furnished with powerful compressors for driving tools actuated by compressed air. The Workshops also contain 40 annealing, welding and hardening furnaces and 300 Forges. The smithies are fitted with 35 steam hammers with drop weights up to 4½ tons. All steam cylinders, iron and metal castings required for the engines built by the firm are supplied by its own foundries. There are also shops for

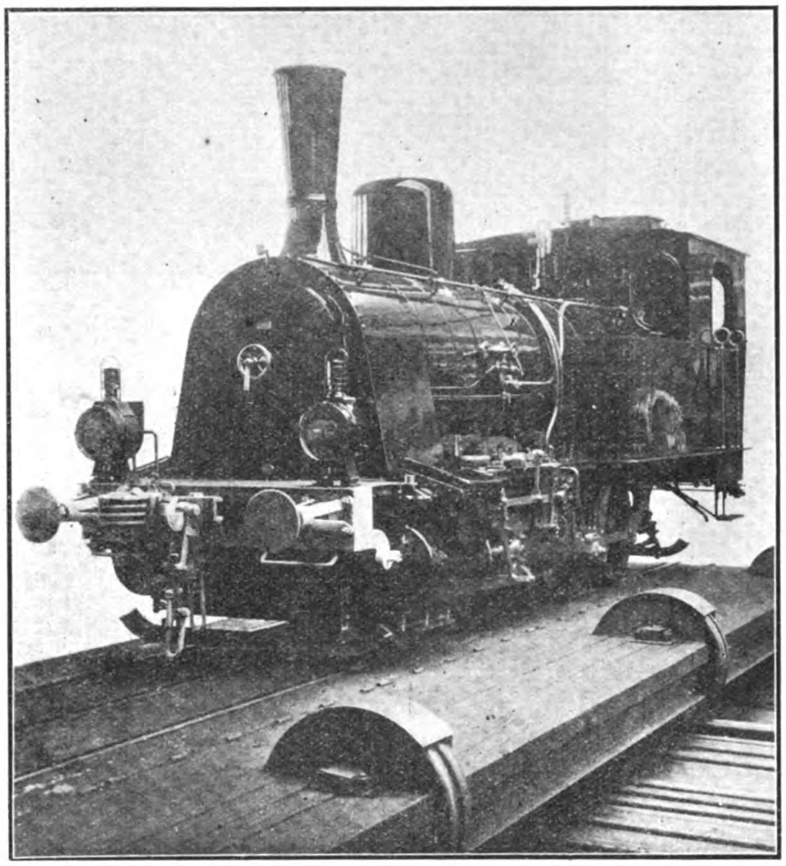
TYPES OF GERMAN LOCOMOTIVES IN USE ON CHINESE RAILWAYS, FROM THE WORKS OF HENSCHEL & SOHN, CASSEL



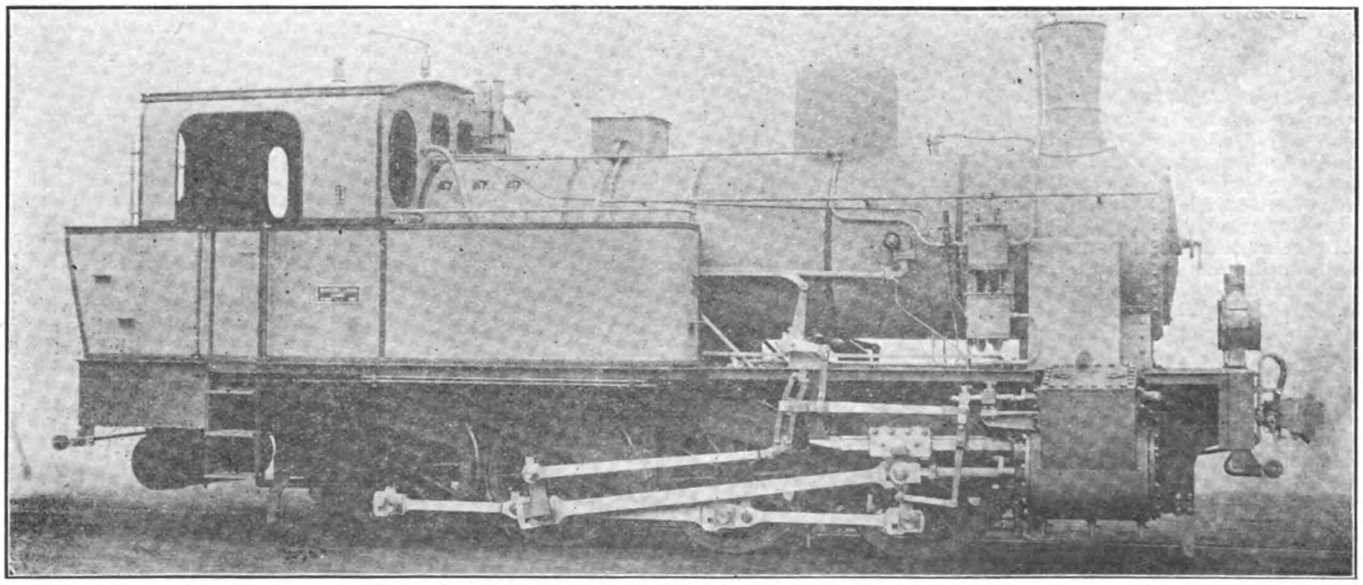
SIX-WHEEL COUPLED TANK LOCOMOTIVE, BUILT BY HENSCHEL & SOHN, FOR THE HANYANG IRON & STEEL WORKS



SIX-WHEEL COUPLED TANK LOCOMOTIVE, BUILT BY HENSCHEL & SOHN, FOR THE SUNNING RAILWAY, CHINA

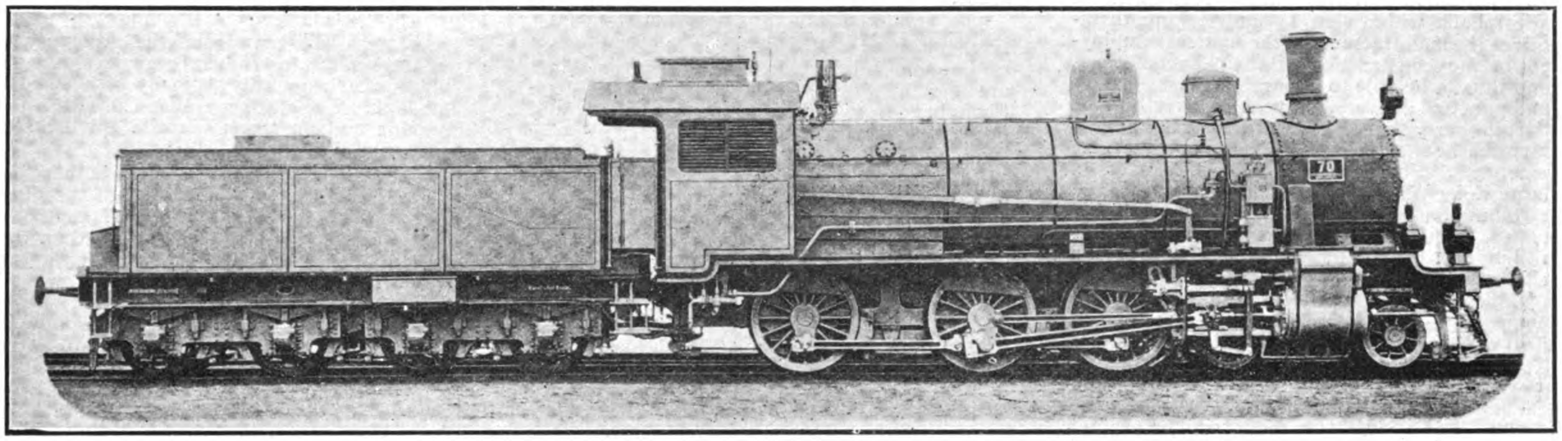


TANK LOCOMOTIVE, BUILT BY HENSCHEL & SOHN, FOR THE TIENTSIN-PUKOW (TSIN-PU) RAILWAY, NORTHERN SECTION



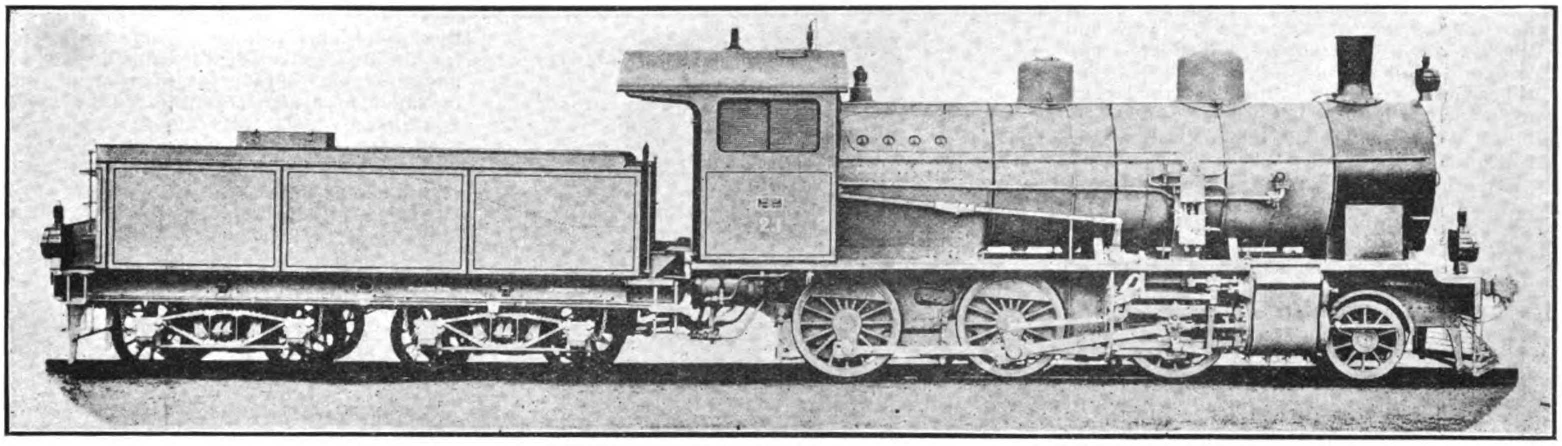
TANK 0.8.0. LOCOMOTIVE, BUILT BY HENSCHEL & SOHN, FOR THE KAINGSU RAILWAY

TYPES OF GERMAN LOCOMOTIVES IN USE ON CHINESE RAILWAYS, FROM THE BERLINER MASCHINENBAU, A.G. FORMERLY L. SCHWARTZKOPE, BERLIN



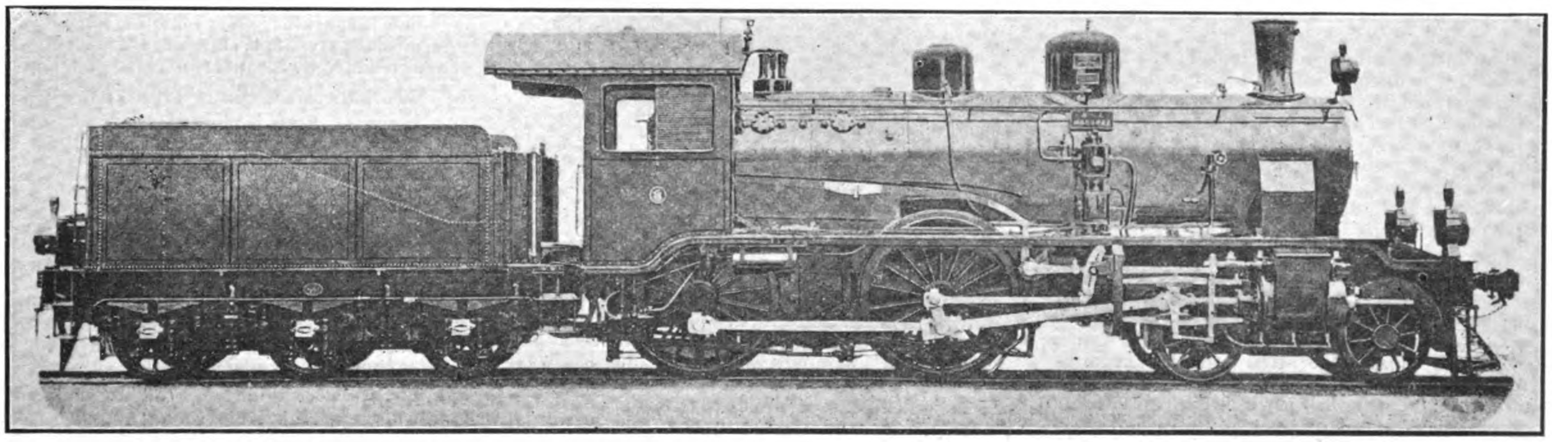
4–6–0 GOODS LOCOMOTIVES FOR THE SHANTUNG RAILWAY (CHINA)

Gauge	8½″	Firebox heating surface	141,5 sq. ft.	Tender:	
Diameter of cylinders	19¾″	Boiler Tubes heating surface	1,565,0 „ „	Diameter of wheels	93⅜″
Stroke of pistons	24¾″	Total heating surface	1,706,5 „ „	Total wheel base	15′ 5″
Driving wheels diameter	53⅛″	Weight empty	110,200 lbs.	Water capacity	3,520 gal.
Rigid wheel base	12′ 5⅝″	Weight in working order	123,000 „	Coal capacity	8,800 lbs.
Total wheel base	23′ 5½″	Weight on driving wheels	102,700 „	Weight empty	49,600 „
Working pressure	170 lbs/sq. in.	Tractive force maximum	23,200 „	Weight in working order	93,600 „
Grate area	26,5 sq. ft.				



2–6–0 GOODS LOCOMOTIVE FOR THE TIENTSIN-PUKOW RAILWAY

Gauge	4′ 8½″	Firebox heating surface	146 sq. ft.	Tender:	
Diameter of cylinders	19¾″	Boiler tubes heating surface	1,740 „ „	Diameter of wheels	39⅜″
Stroke of pistons	24¾″	Total heating surface	1,886 „ „	Total wheel base	17′ ¾″
Driving wheels diameter	53⅛″	Weight empty	116,000 lbs.	Water capacity	4,400 gal.
Working pressure	185 lbs/sq. in.	Weight in working order	132,800 „	Coal capacity	14,300 lbs.
Rigid wheel base	13′ 1½″	Weight on driving wheels	105,900 „	Weight empty	43,905 „
Total wheel base	20′ 8″	Tractive force maximum	25,150 „	Weight in working order	102,100 „
Grate orea	28 sq. ft.				



4–4–0 PASSENGER-LOCOMOTIVE FOR THE CHEKIANG RAILWAY (CHINA)

Gauge	4′ 8½″	Firebox heating surface	109,5 sq. ft.	Tender:	
Diameter of cylinders	18⅛″	Boiler tubes heating surface	1,150,0 „ „	Diameter of wheels	39⅜″
Stroke of pistons	23⅝″	Total heating surface	1,250,5 „ „	Total wheel base	10′ 10″
Driving wheels diameter	69″	Weight empty	103,000 lbs.	Water capacity	2,640 gal.
Rigid wheel base	8′ 6¾″	Weight in working order	113,500 „	Coal capacity	11,000 lbs.
Total wheel base	24′ 3⅜″	Weight on driving wheels	70,600 „	Weight empty	35,700 „
Working pressure	170 lbs/sq. in.	Tractive force maximum	14,400 „	Weight in working order	73,200 „
Grate area	24,7 sq. ft.				

making Tools, Cutters, Spiral Drills, Taps, Files, Nuts, Screws and Bolts. In February 1904 Henschel and Sohn purchased the Henrichshuette Works near Hattingen in Westphalia with a view to undertaking themselves the manufacture of the material employed in the construction of their Locomotives, and thus to be able to ensure first class quality and punctual delivery. Since they have become the property of Henschel and Sohn, the Henrichshuette Works have been considerably extended. There are now 2 blast furnaces, a large Coke Works, a large Martin Steel works, a rolling mill for all sorts of thick and thin plates, combined with Flanging presses, 1 rolling mill for Boiler Tubes and Gas Pipes, a shop for bent Pipes of every description, puddling furnces, a Steel Foundry, a Forge equipped with powerful hydraulic presses and heavy Steam Hammers, 1 rolling mill for Tyres and Wheel Discs, spacious mechanical workshops with the most up-to-date equipment for finishing Engine and Waggon Wheels and Axles, and Steel Castings and Forgings required by ship-building yards and Engineering Works, a ship for the manufacture of electric welded and rivetted drums, combined with a Galvanizing Department, and a factory for making scoria stones.

The Henrichshuette Works employ about 3,500 officials and workmen. The principal products of these Works are:

Plates of all quantities and sizes, Steel Castings and Steel Forgings of every description and of the largest dimensions required by Locomotive Works, Ship-building Yards and Engineering Works, Axles, Tyres and Wheels for Locomotives, Tenders and Waggons, Boiler Tubes, Bent Pipes of any shape, Gas Pipes, Iron Castings of the largest sizes and Iron Drums.

Both Works possess a number of Benevolent Institutions.

For the officials and workmen of the Locomotive Works there are the following (besides the compulsory institutions, such as the sick fund, the accident insurance fund, and the old age and invalids insurance fund) viz: a pension fund for invalids, widows and orphans of the workmen; a pension fund for officials and their widows and orphans; a fund for helping workmen actively employed who may be in need of temporary assistance, called the "Henschel Fund"; a fund for convalescents; free beds in hospitals. There are further for the employees 456 flats; baths; a dining room; a school for the apprentices of the firm; schools for little children and a large hall for meetings. For the employees of the Henrichshuette Works there are similar benevolent institutions. This Works possesses, however, besides its own hospital, a new home for youths, providing board and lodging for 280 unmarried men, 700 flats for married workmen, a club-house for the officials with rooms for visitors to the Works, a co-operative store, etc., etc.

The introduction of Electric Token Instruments for working Single Line Railways has demonstrated that with fast trains the hand exchange for Tokens causes delay and is a source of danger to the men: therefore, the necessity of an Automatic Exchanger has become necessary, the rate of speed being maintained and adds materially to the elasticity of working single traffic.

The New Zealand Government Railways for some time past have taken up very seriously the question of Automatic Tablet Exchangers, and have now on their Railway Systems no less than 260 Stations fitted up with same. About 450 engines are fitted with the exchanging gear, and about 3,850 exchanges of tablets are made every day with express trains running at a speed of over 45 miles per hour. The percentage of failures to the number of exchanges in a year is only one in a 100,000.

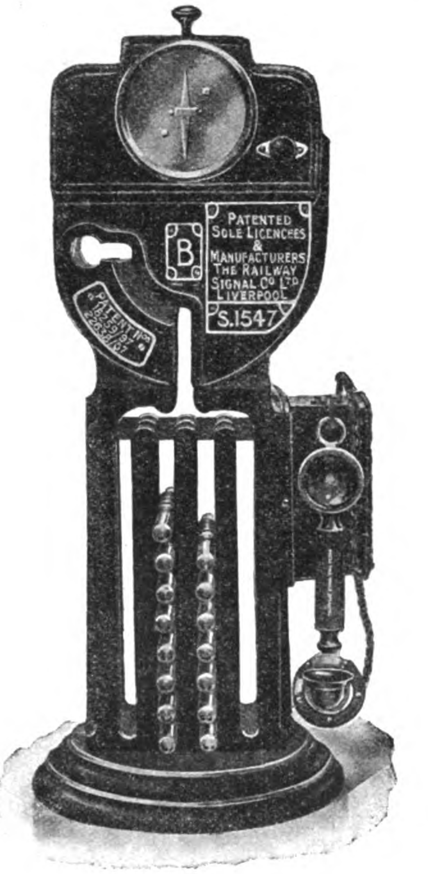
The special features in the construction of this apparatus is the simplicity, its reliability under all conditions of working maintenance being reduced to a minimum, the only part requiring occasional renewal being the rubber block. The moment the exchange has been effected the arms on the exchanging standards automatically swing clear of the running roads.

The Manufactures of the Automatic Tablet Exchangers are, Messrs. Tyer & Co., Limited of London and Carlisle, whose Agent in China are Samuel & Co., Ltd., 66 Szechuen Road, Shanghai, from whom all information and quotations can be obtained.

The Government have placed an order with Messrs. Tyer & Co., Limited, for a large number of their Single Line Tablet Instruments for Uganda. These Instruments are a combination of Absolute and Permissive Block working, the latter in times of seasonable traffic enabling over 40 trains to be sent consecutively in safety in one direction. They are so arranged that at any time Permissive work can be cancelled and Absolute work be carried out. There are various types, but the main idea is the same in all.

SIGNALLING ON CHINESE RAILWAYS. II.

In our issue for last December, we mentioned some of the safeguards provided against Railway accidents, especially collisions on single tracks.



The original method used for controlling trains on single lines was the train staff. This, then a mere stick, was first employed in the construction of the second Standedge Tunnel on the London and North Western Railway in England, and was first used for lines open for traffic near Leamington, on the same Railway, in the sixties. The train staff became the principal means of operating single lines, and this led to the popularity of the Electrical Train Staff when it was designed in 1889, as by its use the form of token to which drivers were accustomed was retained.

The Electric Train Staff, as originally designed, was of the large type, well suited to the train speed of the day; but, of late years, with the greatly accelerated speed of Express Trains, the large and heavy type of staff became, of course, a disadvantage, and this led to the development of the present "Ministure Train Staff" now so extensively used.

As will be seen from the accompanying illustration, the instrument occupies but a very small space, being only 7½ in. by 9½ in. and 2 ft 2 in. high. The staffs are all in full view of the operator, and provision is made for the staffs being used uniformly.

For each section of single track there is a pair of instruments, one in each of the signal-boxes or station master's offices, controlling the section. These are joined together by a single line wire. A bell, actuated by the same wire, is provided for each instrument, whereby the men communicate with each other, and no train may enter on to a section of single line unless the driver be in possession of a train staff for that section.

The train staffs may be withdrawn from either instrument when permission is electrically given by the man at the other end, but when a staff is withdrawn, no other staff can be taken out of either instrument until the first staff withdrawn has been placed in the instrument at the other end of the section, or restored to the instrument from which it was withdrawn.

In some countries it is often necessary to start a second train through a long section before the first has arrived at the other end, and for even a third and possibly a fourth. The "Miniature Train Staff System" lends itself to safely controlling train-working under these conditions, without complications; ensuring the due arrival of all trains dispatched in one direction, before the instrument can be operated to dispatch a train in the opposite direction.

The Miniature Staff Apparatus also provides for assisting or pushing engines, for banking trains up an incline, which then return to the entrance of the section and do not go through.

It can also be arranged for a train to be shut into a siding—as for example, a ballast pit—in a section, and for the section to be free for other trains in either direction, without the first train or its engine going through the section. Signals need not be provided at these, or other, sidings on lines protected by Train Staff Apparatus, except where such sidings come at a Station where the Train Staffs are exchanged.

It has already been said that only one line wire is used, and this provides bell communication also; but, it goes still further, as a telephone service is given, in addition, on the same wire.—Special telephones are used, and they remain ready for communication at all times, whether a staff be out or not.

The instruments may also be worked by a magneto generator which dispenses with batteries and makes the system ideal for hot climates where the batteries evaporate or for cold climates where they freeze.

The apparatus is simple, strong, of few electrical parts, and suitable for operation and maintenance by an inferior class of labour.

Two indications can be given, namely:—

Staff in, line clear.
Staff out, line blocked.

or three, namely:—

Staff in, train arrived.
Staff out, train coming.
Staff out, train going.

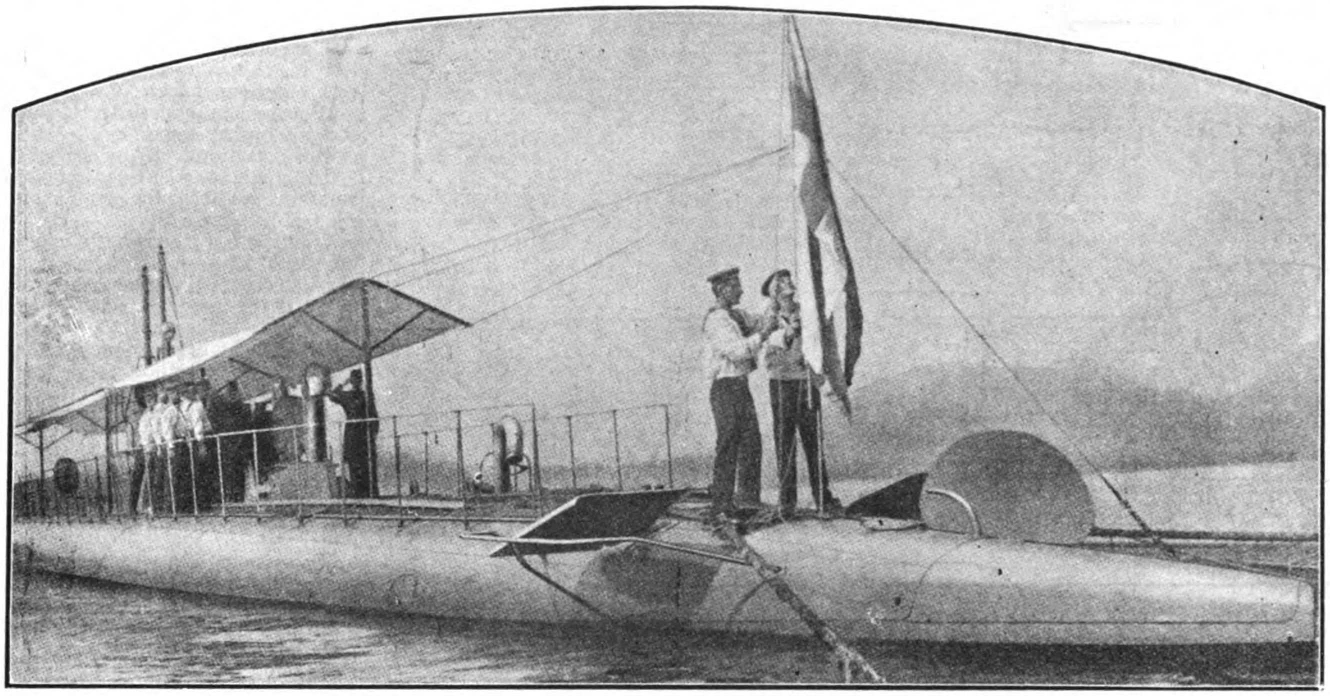
These indications are given automatically.

When it is desirable to reduce the number of signal boxes that are open, one or more may be closed and the sections lengthened accordingly by a simple contrivance.

The Electrical Train Staff Instrument was invented by that celebrated Engineer Mr. F. W. Webb, in association with Mr. A. M. Thompson, and it may be interesting to know that over 12,000 are in use to-day in all parts of the world.

The apparatus is manufactured by The Railway Signal Company Limited, Caxton House, Westminter, London, S.W.

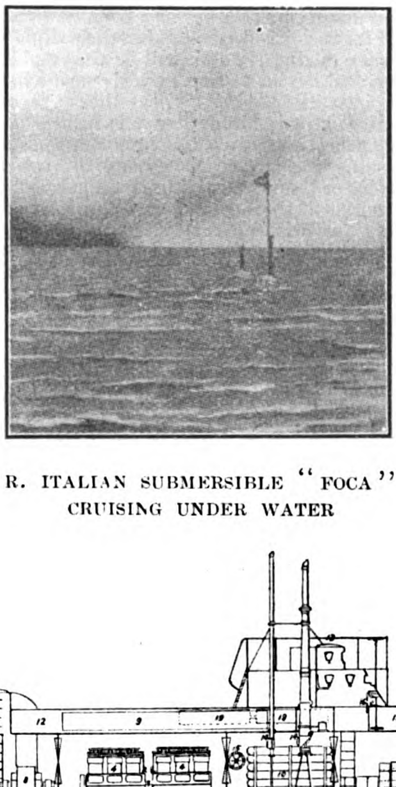
NATIONAL DEFENCE BY SUBMARINES



THE SWEDISH SUBMERSIBLE "HVALEN," CONSTRUCTED BY THE FIAT SAN GIORGIO, SPEZIA, ITALY

There appears to be little doubt that future great Naval Wars will be decided, as in the past, by the conflict of heavy battleships which can seek out the enemy in distant waters and bring him into action. But it seems probable that, in the event of war, the means of defence of comparatively weak Powers would be found to have in recent years rather outstripped the offensive capabilities of the great Navies.

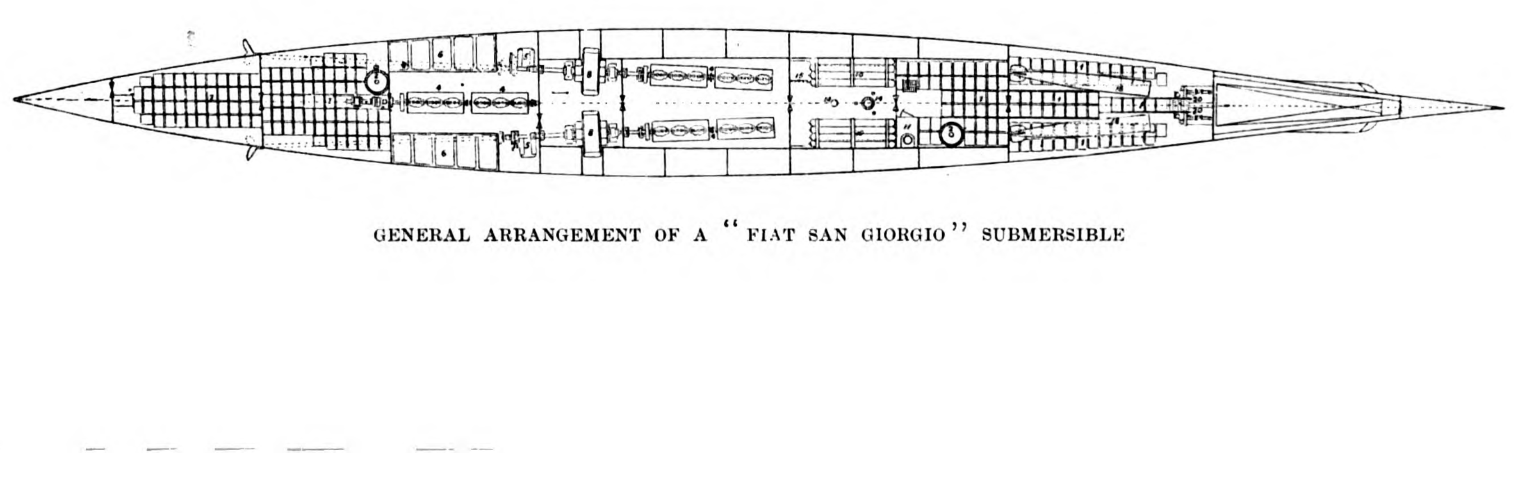
If we regard the history of Naval Warfare from Actium to Tsu-Shima we find, what it must until recently have been regarded as a truism to remark, that the contests between the opposing ships partook of the essential quality of a ship; that is to say, that as the ship could only fulfil her functions on the surface of the water, so all the fighting took place there. It is a notable fact that the two latest developments of the art of war on the marine side, which both refer to defence rather than attack, do not come into this category, but exert their influences respectively one above the surface of the sea and the other beneath it—the airship and the submarine. It is, of course, well known that submarine defence by means of mines dates back to the Crimean War, but this is to be distinguished altogether from attack by submarine *ships*. The airship may or may not play an important part in future Naval Warfare—that is, as opposed to ships on the surface of the water—but at present its capabilities appear to be confined chiefly to the defensive purpose of scouting.



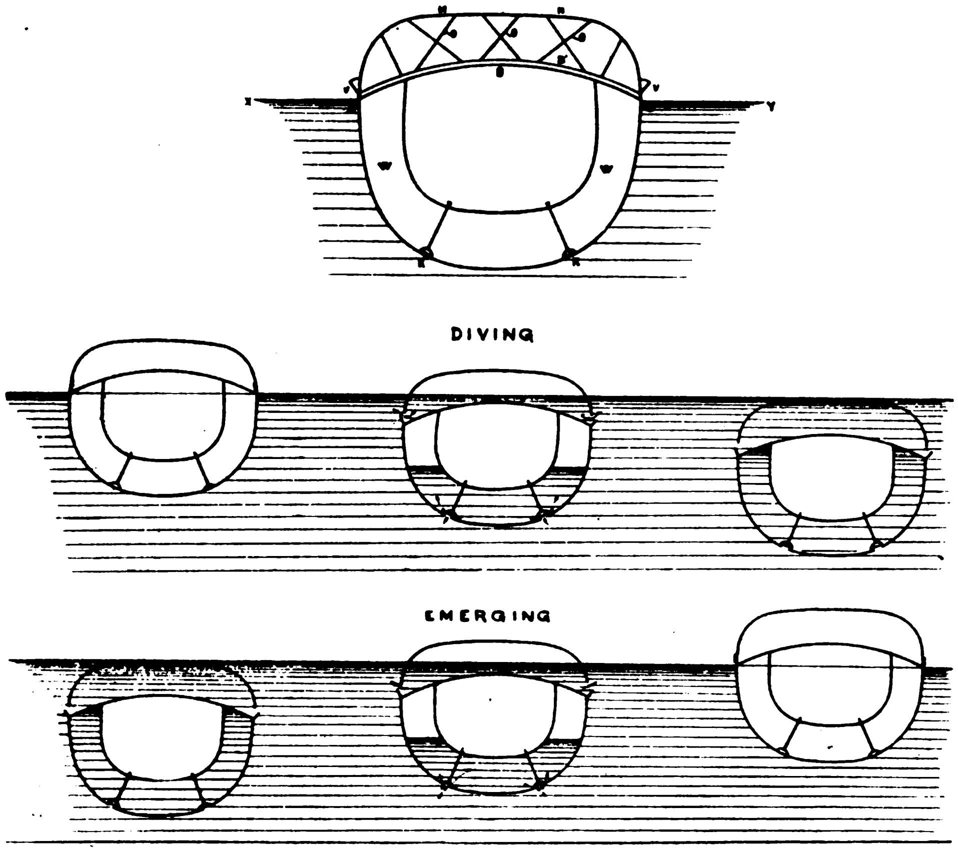
R. ITALIAN SUBMERSIBLE "FOCA" CRUISING UNDER WATER

The submarine, however, has actually arrived and must be regarded as a very important factor in all future Naval Wars, the British Navy having already over eighty of these vessels. In any warfare, efficient means of attack is much the same as efficient means of defence, and in Naval Warfare this is especially the case. Probably the submarine is, in proportion to its cost, the most useful defensive weapon that exists at present.

For small States and Colonies which can only expect to repel rather than to seek their enemy, it will probably be by far the best investment, as its cost is so low in comparison with its capabilities. The fact that the employment of submarines exacts perhaps the highest degree of calm courage, with the very smallest allowance of "the fun of the fight," will never act as a deterrent to the brave men of all nations who



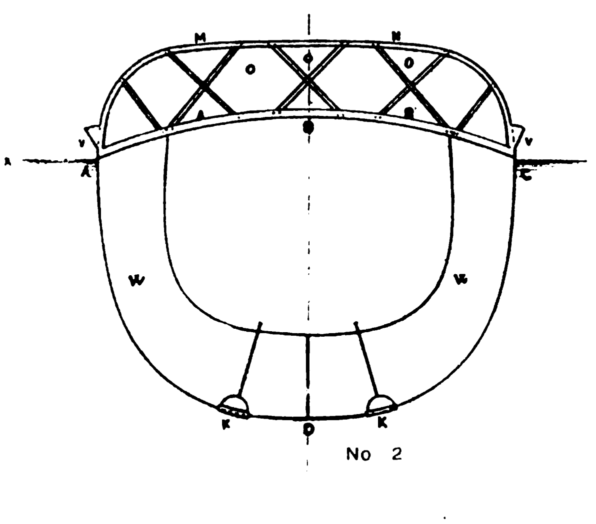
GENERAL ARRANGEMENT OF A "FIAT SAN GIORGIO" SUBMERSIBLE



will be called upon to risk their lives on board them. The old days of the cutlass and boarding-pike are gone for ever, and the modern battle, either ashore or at sea, is essentially a cold and less romantic affair than formerly, but demands really a far greater amount of nerve.

The submarine possesses several important advantages over all other torpedo craft. She can attack by daylight, as she is invisible when submerged, her presence being only evidenced by her periscope, a very small object and only noticeable when the boat is at a high speed, which is not necessary when attacking as it is for all other torpedo boats. Her attack takes place when she is either stopped or going slow. This condition affords her officers time to take very deliberate aim, so that the proportion of hits to misses will be much higher than with the ordinary torpedo boat. Another advantage is that while submerged she is protected from gun-fire altogether.

Finally, it is to be noted that the submarine, regarded essentially as a rapidly mobile battery of torpedo-tubes, supplies a modern squadron with a most valuable implement for defending a chosen base of operation. If, for instance, a naval force requires either to coal, or to repair damages sustained in action, or to give the crews a rest, and for one of these purposes some undefended base has been selected, the sole means of keeping hostile ships at a distance during the day will be the employment of several flotillas of submarines, which, being sent into the offing, will either prevent an enemy's attack altogether, or fulfil the more modest but hardly less important object of retarding the attack and giving the ships time to prepare themselves, thus avoiding a surprise.


No 2

Taking all these points into consideration, it cannot be doubted that, if skilfully and courageously handled, the submarine is destined to play a great and novel part in the next Naval War.

Modern Naval War, especially the struggle between Russia and Japan, has very clearly demonstrated the failure of the ordinary torpedo boat as an effective implement of attack at night, for the simple reason that as no human being can see clearly in the dark, it is extremely difficult under these circumstances even to detect a ship, still more so to determine her speed, direction, or nationality. A case in point is the unhappy experience of a Russian torpedo boat which, after a night attack, joined a Japanese squadron and kept company with them till the morning, when both parties recognised their mistake.

In order to make effective practice with torpedoes it is indispensable that the target should be clearly seen, and this is only possible by day. As in the daytime ordinary torpedo craft, especially of the sea-going class, will in all probability be destroyed by the guns of the attacked ship, it has become necessary to devise some more certain means of using the torpedo in broad daylight.

Of all torpedo boats, those most certain in their action either by day or night are submarines, their protection being their power of concealing themselves under water, leaving exposed only a small portion of a periscope through which their officers are able to observe with exactness an approaching ship.

Besides their very doubtful capability of bringing their tropedoes to bear by day, ordinary torpedo craft have another great drawback, viz., that their only efficient protection is high speed; but the higher the speed of the boat at the time the torpedo is discharged, the lower the chance of making a hit, whereas to increase this chance to the utmost is the very *raison d'être* of a torpedo boat.

An ideal submarine torpedo boat would fulfil the following requirements:—

To be as efficient when at the surface as any other good sea-going craft.

To have such accommodation for officers and crew as will ensure reasonable comfort.

The surface speed to be high, so as to enable her to follow a squadron of battleships or reach harbour quickly.

When submerged, to be capable of being kept steadily on her course and to have a very large radius of action at a low cruising speed.

To combine all these requisites with the smallest possible dimensions of hull for the sake of handiness.

We have not mentioned a very high submerged speed, because, the protection and principal characteristic of a submarine being her invisibility, if she goes fast with her periscope out of water this makes such a show that the boat will be easily detected and either avoided or destroyed. The photograph on page 65 indicates how prominently the presence of a submarine is betrayed by her running at a high speed with her periscope up. The tactics of a submarine should resemble those of a shark; she should cruise about at a low speed in the region she has to defend, and discharge her torpedoes when the chosen ship is in the right position.

This system is pretty certain to give a good result, as the commander of a submarine can see the target ship perfectly well by day and has ample time to take, deliberate aim. What different conditions from those under which the gallant commander of an ordinary torpedo boat labours, rushing at full speed on a dark night!

Amongst the many classes of submarines lately built, one type has come prominently to the fore, viz., Laurenti's, built by the Fiat San Giorgio Co. of Spezia.

Constructor Laurenti, having in mind the above principles, has devised a submarine possessed of the following qualities:—

(*a*) A hull of the form of an ordinary torpedo boat and consequently adapted for a high surface speed.

(*b*) Great reserve buoyancy while at the surface so as to conform to ordinary sea-going conditions.

(*c*) High engine power (internal combustion) for surface travelling.

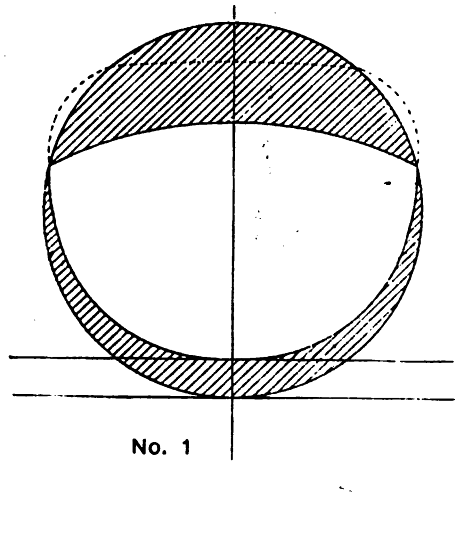
(*d*) Large oil bunker capacity, affording a great radius of action.

(*e*) Very moderate draught, a highly important consideration in comparatively shallow waters, such, for instance, as the North Sea harbours.

(*f*) The smallest internal cubic capacity of any submarines in other respects of the same fighting value.

These qualities, besides others to be referred to later on, have been obtained by the special construction of the hull, which is not of the circular section usual in submarines. The midship section is illustrated the beam being just sufficient to afford space for the machiner and the depth to provide head-room for the crew.

For instance, if the breadth necessary for the engines, &c., has been found to be 10 ft., and a


No. 1

head-room of 6 ft. 6 ins. is decided upon, the hull will be formed internally to these dimensions, whereas a circular hull would require a diameter of 10 ft., involving a much larger internal cubic capacity. The accompanying sketch No. 1 shows the difference between the two systems, the hatched portion expressing the hull-volume saved by our system.

The hull is sub-divided by several water-tight bulkheads, the necessity for which has been clearly demonstrated by various accidents to submarines. It is possible that "C 11" would not have sunk so quickly if she had been thus divided.

The great reserve of buoyancy at surface trim is obtained by the arrangement of the superstructure. This also forms the deck, and is attached to the hull proper by strong beams which reinforce the upper works of the hull and enable it to withstand the heavy pressure experienced when submerged.

Sketch No. 2 illustrates this special construction of the boat.

A B C D is the hull proper.

A M N C the water-tight superstructure.

A B C one of the strong beams referred to.

O O O bracing connecting the strong beams with the deck beams of the superstructure.

X Y the water-line.

Along the sides of the superstructure and above the water-line XY several valves are fitted, which are opened when the boat is prepared for diving.

To submerge the boat, water is admitted to the water ballast tanks W W by opening the Kingston valves K K. When she begins to sink, and during the process of sinking, the superstructure is automatically filled through the valves V V. It must be noticed that the water in the superstructure is not water ballast proper, as the sinking of the boat is not affected by it.

When the boat is to be brought to the surface, water is expelled from the tanks W W either by an electrically driven pump or compressed air, and as the boat rises the water flows automatically out of the superstructure through the valves V V. When the tanks W W are empty the water line is again at X Y and the superstructure is empty.

After the surface is reached, the valves V V are shut, and the superstructure, being thus made water-tight, gives the boat the large reserve of buoyancy which assures to her the same sea-going qualities as an ordinary torpedo boat. This arrangement is entirely different from that of all other submarines.

The longitudinal section shows how the boat is sub-divided, and also the device of keeping all the water ballast in the midship compartment, which is advantageous for facility of trimming the vessel as well as making her handy on her helm.

The ballast tanks as constructed by the Fiat Co. are of heavy plating, to adapt them for being emptied by pumps when at a great depth in the event of there being little or no compressed air left. Nearly all other submarines have their tanks built of lighter scantling, so that if they are at a great depth and short of compressed air, the emptying of the tanks is accompanied by a risk of the plates collapsing under the external pressure.

The Fiat San Giorgio submarines of Laurenti's type have been adopted by the Italian, Swedish, Danish, and United States Admiralties, which have all been highly satisfied with the good and trustworthy qualities possessed by these boats. The most important test of their excellent sea-going character has been afforded by the recent voyage of the submarine "Hvalen." The "Hvalen" has a small internal cubic capacity—only 185 tons displacement in surface trim—and her principal dimensions are:

Length	42.48 m. = 139.4 feet.
Beam	4.28 m. = 14.0 ,,
Draught	2.50 m. = 8.2 ,,

She is propelled by three sets of Fiat petrol marine engines, each driving one screw.

The "Hvalen" left Spezia on July 30th, proceeded direct to Carthagena, coasting round the Gulf of Lyons to avoid bad weather, and arrived on August 2nd, having covered a distance of 790 nautical miles without a stop. This run was at that time the longest ever made by any submarine of whatever tonnage, and is still the record distance-run for any submarine of the "Hvalen's" displacement. From Carthagena the "Hvalen" went to Gibraltar, from Gibraltar to Lisbon, from Lisbon to Oporto, from Oporto to Vigo, from Vigo to Ferrol, from Ferrol to Brest, from Brest to Portsmouth, from Portsmouth to Ymuiden, from Ymuiden to Kiel, and from Kiel to Stockholm.

The vessel was absolutely without escort. She met with some very rough weather, especially on the coast of Portugal and in the Baltic, but always behaved splendidly and kept up her cruising speed, making such good weather of it that her crew were always able to cock their food on deck.

Captain Magnusson and Lieutenant Von Heidenstam, of the Swedish Navy, were the two officers on board, and great credit must be given to them and their petty officers and sailors for the remarkable performance, as well as to the Fait San Giorgio Co. and Constructor Laurenti.

NEW CHINESE GUNBOAT "YUNG FUNG"

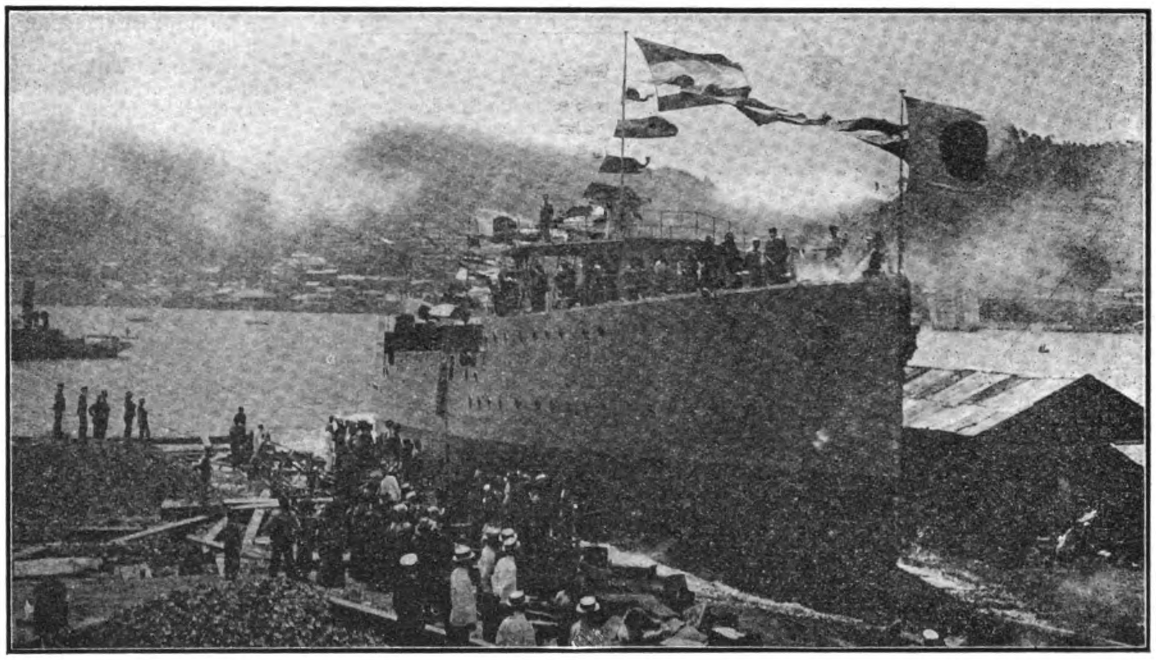
BUILT BY THE MITSU BISHI DOCKYARD AND ENGINE WORKS.

The first warship built at the Mitsu Bishi Dockyard and Engine Works, Nagasaki, for a foreign country was successfully launched on the 5th of July. The vessel is a gunboat, designed for river service, ordered by the Chinese Imperial Government. The keel of the Yung Fung was laid down on August 15th, 1911, and the contract calls for her completion within twelve months. Her dimensions are as follow:—

Length, B. P. P.	205'-5"
Breadth, extreme	29'-6"
Depth, moulded	14'-9"
Draught, excluding Keel	8'-0"
Displacement	830 tons
Indicated Horse Power	1,350 H. P.
Type of Engine	2—Vertical Triple Expansion Engines.
Type of Boiler	2—Steel Cylindrical Boilers.
Propeller	Twin Screws.
Wireless Telegraph ..	One complete set of the "Teishin-Sho" Type (Singing Spark System.)
Keel Laid	15th August, 1911.
Launching	5th July, 1912.
Delivery	15th August, 1912.
Speed on Trial Trip ..	13½ knots.

The crane that is being built to be planted at the Mitsu Bishi shipbuilding Engine Works, Nagasaki, will, it is said, to be the largest in the world. It has a length of 800 ft. breadth of 116, and a height of 130. It will be finished next month.

It is reported from Tokio that three battle-cruisers which are now being built for the Imperial Navy at Nagasaki, Yokohama, and Kobe are to be sister-ships of the Kongo, which was launched in England on the 18th instant. The principal armament of these vessels, which consists of eight 14-inch guns, or 13.5 in calibre, together with 16 6in. guns will probably be constructed at the Muroran Steel Foundry. The Kongo is an armoured cruiser, laid down in 1911. The names of her sister ships will be Hiyei, Kirishima and Haruna. All four vessels are to be 27,000 tons displacement, and will have turbine engines of 64,000 h.p.

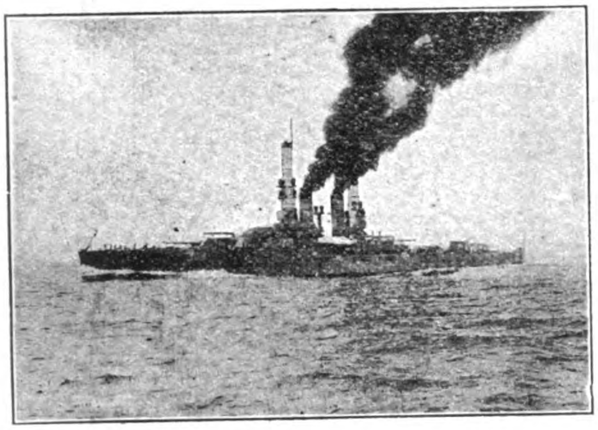


CHINESE GUNBOAT "YUEN FUNG," LAUNCHED AT THE MITSU BISHI DOCKYARD & SHIPBUILDING WORKS AT NAGASAKI

FINAL ACCEPTANCE TRIALS OF THE U.S.S. "UTAH" AND "FLORIDA."

These latest dreadnaughts of the U.S. Navy cost in the neighbourhood of $10,000,000 apiece. Vessels for the Navy are put through a builders' trial and then through a Government trial before they are accepted. These trials are made under what might be called "special conditions." The course is selected, the crew is selected and the officers are selected. After the vessels has been turned over to the Government and gone into service, which may be a year or more later,—when she has her own crew, regular fuel, her own officers and is in every sense a "regular vessel," she is put through another Navy trial, and in that trial the conditions are those of actual service. There is no opportunity for any selection or specialization in connection with course, officers, crew or fuel.

The "Utah" and "Florida" were designed for 20.75 knots. The "Utah" during her standardization trial over measured mile ran 21.92, the "Florida" 22.54. During the four hour trials the "Florida" showed 22.07 average speed and the "Utah" 21.042.



U. S. S. "FLORIDA"

What does this mean to the Nation and to the crews of these ships? It means that the vessel is so much more able to get into action or to get out it. She is able to catch a vessel in case of war whom she desires to overtake or is better able to get away from a vessel that desires to overtake her, thus enhancing the safety of something like one thousand lives on board each boat.

Speed is one of the controlling elements of defence. These vessels have speeds far beyond those for which they were designed. It is a factor which may mean the saving of the whole ship or the winning of a victory with all its consequences upon the Nation's honour and the Nation's commerce. It all comes back to the careful engineering that was done in designing the vessel and certainly no one detail was of as great importance as the forced draft system whereby the air is supplied, without which the ship could not go. It is a well known fact that all fuels in order to burn require to be supplied with air, as the heat of a fire is produced by the chemical action which takes place when the combustile unites with oxygen, which gas forms one-fifth of the earth's atmosphere. In these ships the necessary air is forced under the boiler fires by means of "Sirocco" Blowers, designed and manufactured by the American Blower Company of Detroit, Mechigan.

With the finest turbines, best boiler power, best fuel and best stoking the vessels could not have attained the speed they did if there had not been air enough. The Navy Department say frankly that they had an abundance of air and that everything was perfectly satisfactory.

In short, this superior forced draft system renders these vessels with all that they are as representatives of the Nation's honour, safety and protection in the time of need, far better able to do their work.

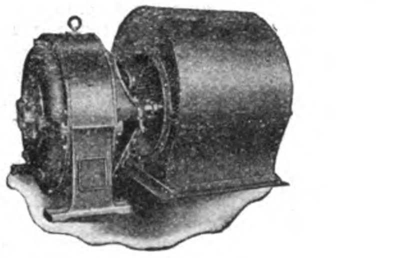


FIG. 1

Twelve blowers with direct connected motors like the one shown in Fig. 1 are installed on each of these boats.

The wheel of each blower is only 33" in diameter, but owing to its great efficiency is capable of delivering 28,500 cubic feet of air per minute.

With all blowers in operation at the same time the amount of air delivered to the boiler fires is 342,000 cubic feet per minute, or 768 tons of air per hour.

The collective capacity of the 12 fans used on each battleship can, however, be expressed more comprehensibly in terms of space than by weight, so that a clearer realization can be obtained when it is considered that 768 tons of air per hour means slightly more than would be contained in a tank of 200' long, 200' wide and 510' high.

Under average conditions about 18 pounds or 240 cubic feet of air are required to provide enough oxygen for the combustion of one pound of coal so that the full set of 12 Sirocco fans will furnish sufficient air to burn 43 tons of coal per hour.

Every inch of space in the machinery rooms of a man-of-war is valuable so that these important factors in the ship's equipment are crowded into the smallest possible compass, making it impossible to secure good photographs of the installations. The one from which Fig. 2 was made was taken on the "Florida" and serves to show clearly the extremely small comparative size of the blowers which have the tremendous capacity noted above. It is, in fact, only since the invention of the "Sirocco"

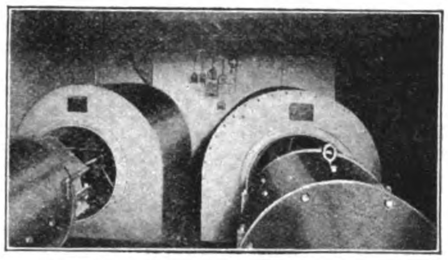


FIG. 2

Blower that it has been possible to provide any such immense air handling capacity within such limited space, as blowers of the older types capable of the same service are much more cumbersome machines.

PALMETTO PACKING FOR THE "THUNDERER."

It is interesting to note in connection with the completion of the very successful full power trial of the Battleship "Thunderer" on the 5th of March last, that her builders, The Thames Iron Works, Shipbuilding and Engineering Co., Ltd., purchased "Palmetto" packing for use aboard the Super-dreadnaught at her trial, and the high record made on the trials would indicate that the judgment of her builders was not at fault, even in so small an item as the selection of the rod packing.

Steam engineering of the present day development, with its high pressure and super-heated steam, requires a rod packing far different from those that gave satisfaction in the past. Superheated steam makes impossible the using of any packing made wholly or in part of vegetable substance, such as rubber, cotton duck, etc., and even asbestos in its ordinary state quickly hardens when submitted to great heat under pressure.

The reason "Palmetto" packing is selected to work under expreme conditions is because it contains no vegetable substance, and by a special treatment of each single strand with a graphite grease lubricant before plaiting the tendency to harden is removed. The lubricant serving the double purpose of preserving the soft pliable nature of the packing, and so lubricating the rod as to reduce friction load on the engine and enhance the life of the packing.

G. E. HEATING AND COOKING DEVICES.

The Heating and Cooking Devices developed by the General Electric Company are efficient, thoroughly practicable and convenient. Efficiency and practicability are insured by the use of "Calorite" for the heating elements. Calorite is recognized as the most efficient substance ever produced for converting electricity into heat. It is the result of extensive and costly research work in the Company's laboratories, and is used exclusively in the Company's devices. These devices are adapted to both household and industrial purposes, and can be used to excellent advantage in homes, hotels, and hospitals; in the offices of physicians and dentists; in book binderies, laundries, tailor shops, etc. Their use insures cleanliness and the lightening of labor, and they are applicable in all places having suitable electric wiring, in many cases it being necessary only to connect the devices to the ordinary lighting sockets. The home devices particularly are attractive in appearance, occupy no more space than ordinary cooking utensils, are much more convenient and are being widely used.

In addition to the superior cleanliness of these devices they are better than all methods of heating by flame in that they are entirely free from the disagreeable odors given off by gas, gasoline, oil or coal stoves. Also, they are perfectly safe being absolutely free from dangers such as gas asphyxiation, explosions, and all fire risk.

The G. E. Flatirons are designed to meet all the requirements of domestic and industrial work. They are available in various sizes, varying from 3 to 24 pounds in weight: 3-lb. irons for light pressing of all kinds such as shirt waists, baby's clothes, collars, ties, and ribbons and delicate and valuable laces and embroidery; 4½ and 6-lb. diamond face and morocco faced polishing irons; 5, 6, and 8-lb. irons for all kinds of regular ironing; and 12, 15, 18 and 24-lb. pressing irons for heavy laundry work and tailors' work. The irons may be obtained with detachable plain plugs or switch plugs, with permanently attached cord, or with automatic handle switches. The latter afford a convenient method of maintaining the desired heat without any danger due to accidental overheating. While ironing the handle switch is held in the closed position, but as soon as the handle switch is released the metal cap covering it springs off to one side, thus automatically opening the switch. Ironing may be done, however, with the switch open if necessary. All irons are finished in nickel and present a handsome appearance.

In order to retain all the advantages of electrically heating flat irons and at the same time to do away with the necessity of using an attaching cord on the iron itself, the Company has developed a *heating stand for electric flatirons* which consumes current only when the iron is being heated. The stand is designed to hold two irons. It consists of a shoot-iron base supported on four composition feet, and having in the center an inclined plane of heavy asbestos board. A composition block containing flexible phosphor bronze contacts is located at the foot of the board. The electrical connection to the stand is made by means of the ordinary attaching cord and plug. The iron to be heated is placed on the inclined asbestos board on which it slides down by gravity until the terminals on the iron automatically engage the phosphor bronze contacts on the stand and completes the circuit. The iron heats rapidly as the asbestos board prevents radiation from the flat surface of the

iron. The removal of the iron after heating instantly interrupts the circuit, thus preventing current consumption except while the iron is being heated. Irons not in service can be placed on the shelf on either side of the inclined plane.

G. E. Chafing Dishes are available in a variety of styles. They are designed for kitchen cooking as well as for dining room or parlor use. They are made of aluminum, of simple and substantial construction, and pleasing design. They are easily kept clean.

The method of construction is the same for all. Each disk consists of an outer and an inner shell spun together at the upper edge. Both parts are seamless, the outer is made of polished aluminum, and the inner or water pan is made of copper heavily tinned on the inside. The food pan or blazer is made of polished sheet aluminum, and is provided with a long and convenient side handle. The water pan is provided with two side handles with ebonized wooden grips. Aluminum cooking utensils are becoming very popular, and there are hundreds of cooking recipes that can be successfully carried out with an electric chafing dish. They are a great convenience not only in the home, but also in restaurants, cafes, and clubs, and on yachts, steamships and dining cars.

G. E. Coffee Percolators are available in 1½, 2½, 3 and 4 pint sizes, with either nickel or copper finish. Silver finish can be furnished on special order. These devices enable the making of a delicious and healthful beverage, extracting only the delicate aroma and nourishing elements in the coffee bean, and discarding the tannin and other harmful properties. They are designed to make coffee quickly, the time required varying from 45 seconds to about 2 minutes for starting percolation, according to the size of the percolator, and a total of ten minutes for completing the process, begun with cold water drawn from the fawcet. These excellent results are obtained by the use of a new style pump, and the better heat distribution effected by the new flat disk heating element. The pump is so designed that only a small amount of water is heated at one time in the pocket in the base of the pump, the steam from this forcing out the water through the tube above it, thus obviating the necessity of heating a large amount of water before percolation commences. A handsome line of 3-pint samevers is also available.

G. E. Culinary Utensils comprise a line of devices carefully designed to meet the requirements of different methods of cooking.

G. E. Portable Disk Stoves are of general utility for cooking food of all kinds in ordinary utensils, and are available in sizes of 3½, 4, 6, 8 and 10 inches disk diameter. They are designed for operation from ordinary lighting circuits and while effective and convenient in the kitchen are indispensable in hospital wards, home sick rooms and nurseries, laboratories and other places where smoke, flame and gas is objectionable. The 3½ and 4 inch stoves give a heat of one intensity. The former is suitable for use in laboratories or in dentists offices for heating small quantities of liquids, the 4 inches stove is adapted to general use. The 6, 8 and 10 inch stoves have three-heat switches for providing three heats of different intensities. These stoves heat up quickly, requiring about 8 to 10 minutes to attain full heat, and will remain hot for 10 or 15 minutes after turning off the current. Their design is such that they will not become injured by overheating in case they are allowed to run without anything on them to take away the heat. The Twin Disk Hot Plate is designed to do the work of the usual gas plate. It consists of two 8-inch disk stoves suitably mounted and arranged for operation independently. Until the production of Calorite for use in the heating elements of electric stoves, etc., it was impossible to dissipate the required amount of heat within the area of an 8-inch disk. These Calorite stoves are capable of operating continuously at a red heat without injury. In considering the use of disk stoves it should be borne in mind that on account of their wide range of adaptability to any utensil they are not so efficient for any one purpose as a self-heating device, such as a broiler or a grid designed for that particular purpose.

G. E. Broilers are arranged to provide three intensities of heat. Ten minutes is needed to bring the broiler to full heat, and a steak can be properly broiled in about seventeen minutes. The absence of gas odos, a hot fire and the dirt accompanying other methods of broiling, commends this device to the favor of the public.

G. E. Grids consists of a smoothly polished flat top aluminum casting 9 by 12 inches supported on four malleable iron legs 6 inches long. To bake griddle cakes properly an evenly distributed heat is necessary. This is best accomplished by the use of an aluminum plate. The grid is arranged to provide three heats, but the medium or low heat should not be used for a comparatively short interval of service, as they are better adapted to continuous baking or toasting. About seven minutes heating with full current is all the time required to put the grid in proper condition for baking griddle cakes.

G. E. Radiant Wire Toasters of the domestic type are four inches by seven inches base and seven inches high. They are arranged to toast two slices of bread simultaneously, the time required being about three minutes. The G. E. Toaster embodies a number of excellent features: Large spaces for bread permitting the toasting of any size of slice from that of home made bread to a cheese wafer, with equally good results; the absence of the inconvenient cover required in horizontal design to overcome the drawback of heated air currents; the use of radiant heat which alone can produce perfectly toasted bread, crisp and golden throughout. The restaurant type of radiant wire toaster is designed to toast six slices of bread simultaneously.

G. E. Combination Cookers are available in 2, 4, and 6 quart sizes, arranged for three heats, and 2, 2½ and 3-pint, and 2 and 4 quart tea kettles in two and three heats. These are made of aluminum with highly polished exterior surfaces, and are of great durability.

G. E. Kettles have been tested for 1,000 hours operating at full heat without water, and have showed no signs of deterioration. Kettles can be obtained in brass, copper of nickel finish.

G. E. Frying Pans are available in 5, 7, and 10-inch sizes. They are very convenient in light housekeeping and have no equal in preparing early breakfact. The pan is made of polished steel and is mounted on an aluminum body, thus combining the very necessary characteristics of the ordinary iron utensil with light weight and sufficient strength to withstand long usage. The 5-inch pan is arranged for one heat, the 7-inch for two heats and the 10-inch for three heats.

G. E. Water Heaters are available in various sizes. The one-half pint water heater consists of a white enamel cup mounted on nickel supports. Enamel ware is used for this cup because it can be kept clean easily, and also possesses other sanitary qualities. The addition of a nickel soap tray readily adapts it for use. As a shaving cup. The low current consumption makes it inexpensive and it can be attached to any lighting socket. The pint and quart water heaters are very popular as milk warmers. The cover is made in two parts. There is a removable center, which, when taken away, leaves a hole in which a Hygea milk bottle will readily fit. The standard thin glass milk sterilizer flask may also be used in this manner, by first taking off the cover to allow the large part of the flask to be placed in the heater cup. Only two tablespoonfuls of water need be used. When the heat is on this water is quickly turned to steam, and upon coming in contact with the sides and top of the vessel condenses, falls to the bottom of the cup, and is again evaporated as before. The milk in the bottle becomes thoroughly heated in about one-fifth the time required by the usual hot water method. The water heaters of larger capacity, 2, 4, and 6 quarts, are arranged for three-heats and may be used for cooking vegetables, pot roasts, etc., for a large family. The regular electric Hot Water Shaving Cup and the electric Corn Popper completes this line of devices. The corn popper has a capacity of about one quart and is fitted with a wire mesh dome cover. A convenient handle and rubber tired wheels add greatly to the service ability of the device. After the heating element has become properly heated, only about three and one-half minutes is required for popping a batch of corn.

G. E. Baking Devices includes various types of ovens and the standard domestic range. Baking ovens require a temperature ranging from 250 to 450 degrees F. depending upon the nature of the work to be done.

G. E. Ovens are arranged to provide three heats, the different intensities being readily obtained by means of a three heat switch? This accurate heat control prevents the annoyances due to varying and uneven heat and enables the production of a superior article of cooked food. Furthermore, if a process is once accurately timed and the intensily of heat noted, it is always practicable to duplicate the process. These ovens are not only suitable for all classes of domestic baking, but are also useful for baking processes in the industrial arts and in laboratories.

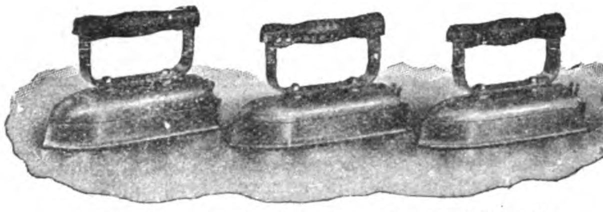
The G. E. Combination Electric Oven and Broiler consists of a substantial extra well heat insulated oven in which the top heating element may be exposed, and so arranged that by inserting a broiler attachment the oven may be used as a radiant type broiler. This permits either roasting or broiling with the same device. The heat of the oven is controlled by means of a three-heat switch; the broiler is arranged to give one heat only by the operation of an off-and-on switch.

The G. E. Domestic Range is developed along the lines of the usual gas range and is intended to conform to the usual methods of cooking with ordinary utensils. It is equipped with extra rapid disk stoves, requires no special utensils, has an enlarged oven, and an overhead horizontal radiant broiler. The three disk stoves on the top plate are used in the same manner as the burners of a gas range except that flat bottom utensils should be used. Printed instructions accompany each range which tell what intensity of heat to use and how long to leave it on to bake or roast the various kinds of meat, bread, cake, pies, etc., thus insuring uniform success. The oven is of ample size to satisfy the demands of a large family. The broiler and oven have independent switches. The space between the stove top and oven makes a convenient plate and food warming closet. The usefulness of the range is increased by the addition of two extra outlets, one for a coffee percolator and the other for a grid controlled by a three-heat switch mounted on the range.

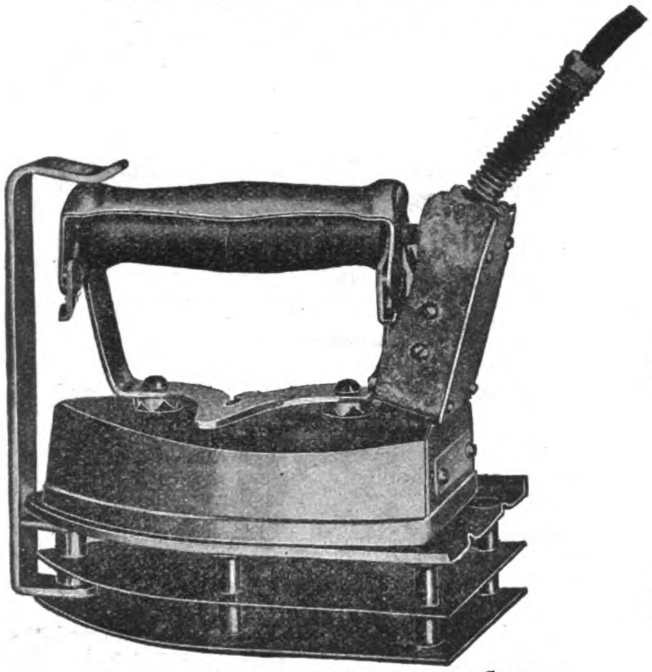
G. E. Heating Devices include several forms of Luminous Radiators and Tubular Air Heaters. The portable luminous radiators have either two or three heating units or glowers. They are efficient, convenient and attractive. The mantle type of luminous radiators uses the same heating units as the portable type, but are designed for permanent installation. They are available in oxidized copper or brushed brass finish. In the tubular air heaters the heating elements are enclosed in metal chimney tubes. These heaters are made in both floor and wall types and consist of four, six or eight tubes. Three heaters are designed to warm large volumes of air at comparatively low temperature and the tubes are arranged so as to have the greatest possible radiating surface. They serve the same purpose as steam or hot water radiators but are much more convenient.

Other heating devices available for industrial purposes are electric glue pots, solder melting pots, stationary soldering irons, portable soldering irons, soldering iron heaters, sealing wax pots, half pint aluminum glue pots, melting pots for lead and tin alloys, celluloid heaters and beer vat dryers.

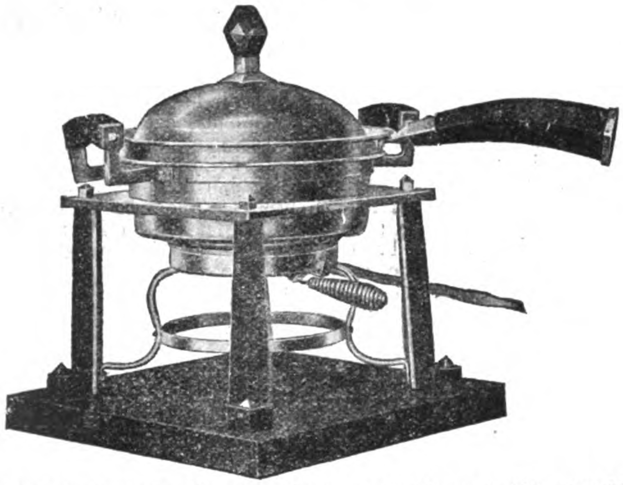
G. E. Glue Pots are quite different from either steam, gas or electrically heated pots of the usual type in that they will operate satisfactorily without a water jacket, thereby



TAILORS' PRESSING IRONS—12, 15, 18 & 24 lb

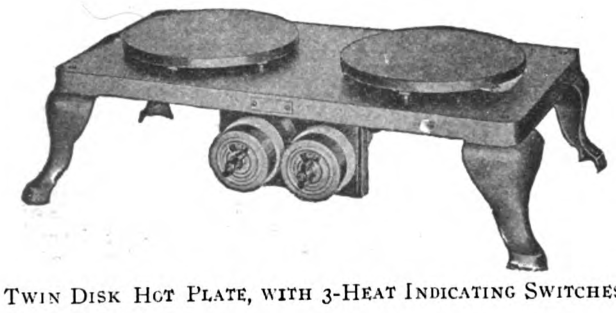


FLATIRON WITH AUTOMATIC HANDLE SWITCH



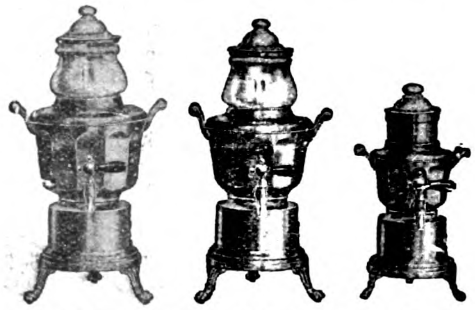
DESIGN S—1,170, CHAFING DISH WITH ENCASED HEATING UNIT

6-INCH DISK STOVE WITH 3-HEAT SWITCH

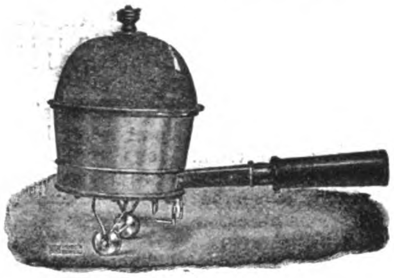


TWIN DISK HOT PLATE, WITH 3-HEAT INDICATING SWITCHES

DESIGN S—1,804, 2½ PINT COFFEE PERCOLATOR WITH ENCASED DISK HEATING UNIT



4, 3 and 1½ PINT COFFEE PERCOLATORS, WITH ENCASED FLAT HEATING UNIT

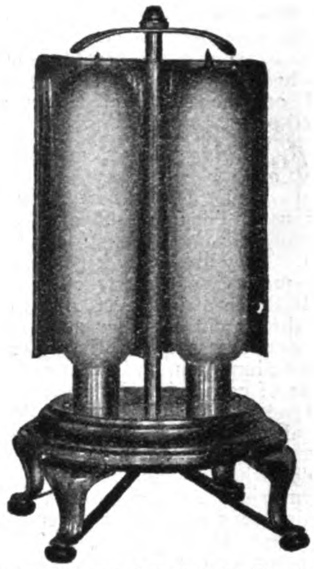


CORN POPPER

2-QUART WATER HEATER

Outside—SEAMLESS POLISHED SHEET ALUMINUM

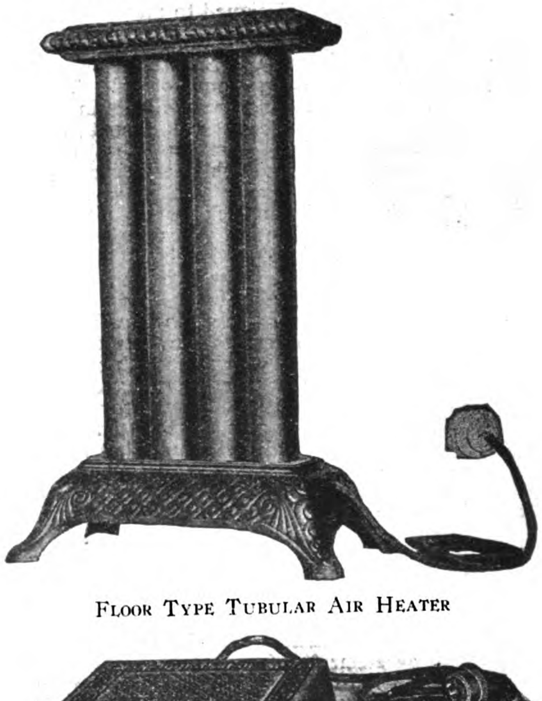
Inside—SEAMLESS SHEET COPPER



TWIN GLOWER LUMINOUS RADIATOR

ELECTRIC HEATING PAD WITH REGULATING SWITCH CORD AND ATTACHING PLUG

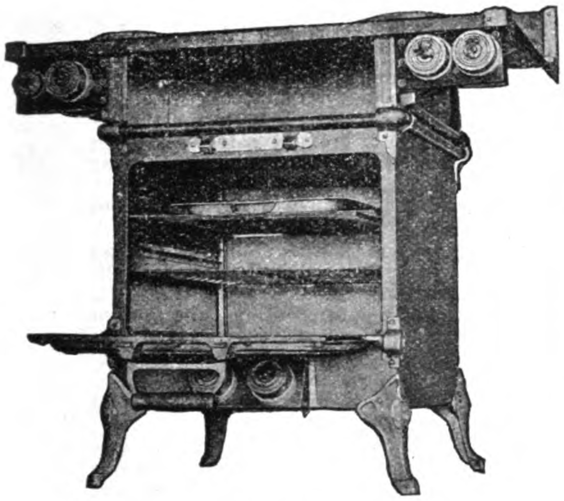
STEEL FRYING PANS—ALUMINUM BODY



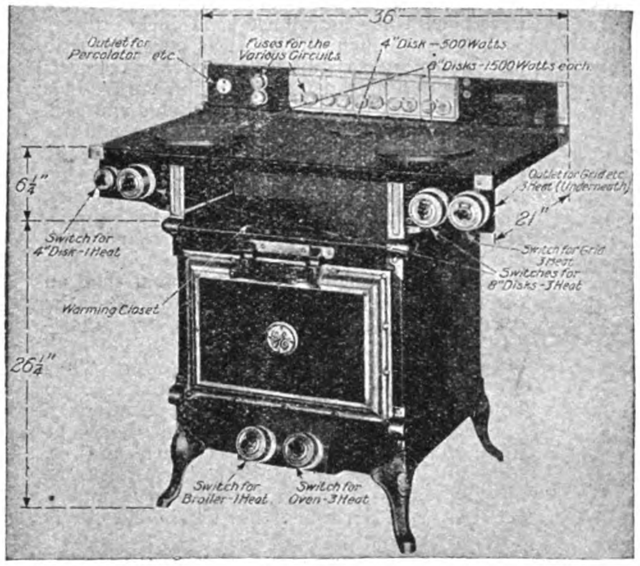
FLOOR TYPE TUBULAR AIR HEATER

ELECTRIC FOOT WARMER

HEATING AND COOKING DEVICES

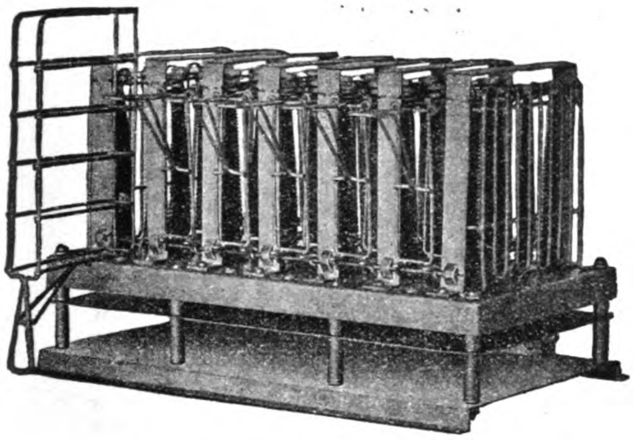


Open View of Type D—22 Domestic Range



Type D—22 Domestic Range

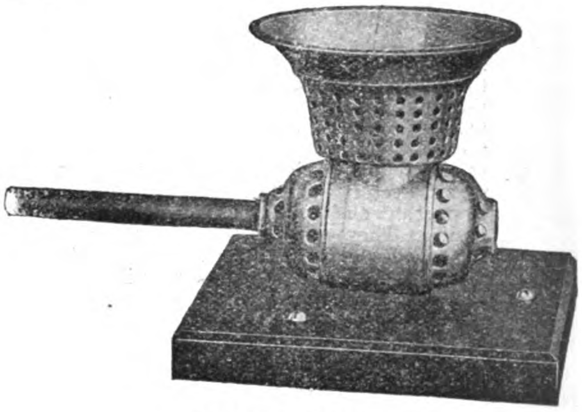
Electric Oven with Broiler



Radiant Wire Toaster, Restaurant Type

Pint Water Heater

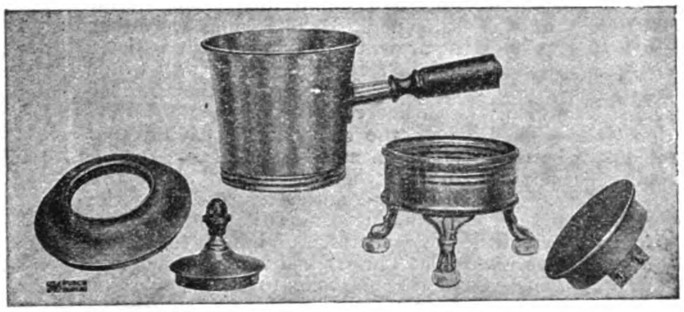
Hot Water Cup



Cosmetic Heater

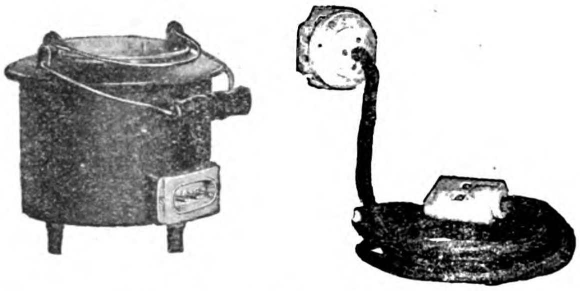
Electric Grid

Soldering Iron on Separate Stand

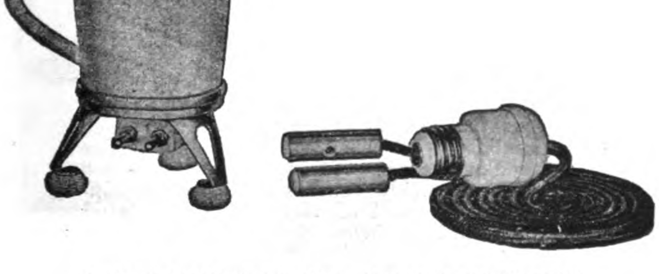


Parts of Pint and Quart Water Heaters

Electric Broiler

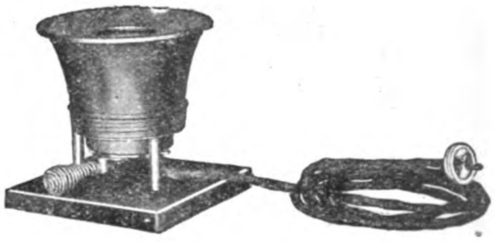


Water Jackated Glue Pot with 3-Heat Wall Receptacle



½ Pint Hot Water Cup—Cup White Enamel, Supports-Nickel

Soldering Iron Heater



Sealing Wax Pot

MANUFACTURED BY THE GENERAL ELECTRIC COMPANY

applying the heat directly to the glue, thus saving the heat taken up by the water in the water jacket. This feature makes these devices very economical. Furthermore, although they operate very quickly, their design absolutely prevents them from burning the glue even if the heat is applied for a sufficient time to dry the contents of the pot into a solid mass. In such a case the addition of water renders the glue as good as ever. They are available in half-pint and two, four and 8-quart sizes. There heats can be obtained by the use of 3-heat switches.

G. E. Soldering Irons are made in stationary and portable forms. The stationary form is very useful in factories for soldering small parts rapidly and continuously. The tips are interchangeable, and copper tips may be substitued if desirable. Although nickel tips have a lower conductivity than copper, they are more advantageous on account of their non-oxidizing and non-corrosive qualities. The Portable Soldering Irons are available in five sizes, and are furnished with or without handle guard rings. The guard ring acts as a stand when the iron is laid on the bench. A separate cast iron stand in furnished, at an extra price, with the iron not provided with a guard ring. The 1¼ and 1½ inch sizes are equivalent to the 3 and 4 pound coppers, respectively. Electric soldering irons remain hot all the time they are being used, and are free from the smut of the muffle furnace. There is no wasting of the copper tip, no waste of heat and no vitiation of the air. They heat quickly, are easily regulated by turning the current on or off, keep uniformly hot, require little current to operate, and can be kept clean or re-tinned easily. They enable the execution of an improved quality of soldering work. They are as indispensable in the home as a hammer or a screw driver.

The list of miscellaneous devices available includes several forms of cigar lighters, the cosmetic heater, the electrotherm or electric heating pad, the surgical sterilizer, and the foot warmer.

G. E. Cigar Lighters are made in pendant and desk or table types for intermittent service, and in goose neck, pendant and telephone types for continuous service. All types are suitable for operation on either alternating current or direct current circuits, and can be readily attached to any convenient lamp socket. The intermittent types are equipped with a push button for closing the circuit and thus heating the plug for use; the continuous types are always ready for use, but the current can be turned off at the socket when not in use. All types are furnished with suitable cord and attaching plugs. The intermittent types are intended for office and domestic use; the continuous types for hotels, cigar stores, etc. The continuous goose neck type is suitable for cigar stores, bar rooms, cafes, etc. It consists of a continuous pendant lighter suspended by a light spring, from a goose neck stand or support 24 inches high. This arrangement supports the lighter at a convenient level when the stand is placed on a show case or counter. The intermittent types provide 1,000 lightings at a cost of about one cent where the electricity is sold at 10 cents per kilowatt hour; the continuous types can be maintained at a cost of about 3 cents a day.

The G. E. Cosmetic Heater possesses many advantages which appeal strongly to actors and managers or owners of theatres, for use in "make-up" rooms. The portable type should be carried by every actor, and the stationary type should be installed in every theatre, thus greatly reducing fire hazard.

The G. E. Electrotherm or electric heating pad is the modern substitute for the inconvenient and troublesome hot water bottle. It is unquestionably the best device available for the local application of heat to the body. It is composed of resistance wire insulated and protected by asbestos woven into a flexible sheet or pad, which when attached to an ordinary incandescent lamp socket radiates an adjustable and constant degree of heat. Sensitive thermostats incorporated within the fabric operate automatically to maintain the heat constant and to prevent it from exceeding the safety limit of 220 degrees F. The size developed for general use is 11 inches by 15 inches by ¼ inch thick. It is provided with an indicating regulating switch, connecting plug and fifteen feet of flexible cord. It is indispensable in hospitals, households and sick rooms. There is no liquid to leak out, and not the slightest danger of burning or scalding the patient. It is of great convenience for relieving general chilliness, cramp and similar ailments, and it is effective in cases of pneumonia, rheumatism, and neuralgia. It is simple to operate, and requires but little attention while in use. It consumes no more current than an ordinary 16 c.p. incandescent lamp, and the different degrees of heat attainable are indicated by the regulating switch. Full length electrotherms can be furnished on order. They are invaluable for operating room use in hospitals. For wet or moist applications a heating pad with a rubber covering should be used. This covering will be furnished on request. The use of the electrotherm furnishes an amount of comfort for the sick, and a refinement of treatment not obtainable otherwise.

The G. E. Surgical Sterilizer available is in the form adopted by the U. S. Army Medical Corps, and is designed to use either steam, boilding water or hot water as the sterilizing media. Its most satisfactory application is the sterilizing of surgical instruments. The electric heating element is applied to the water pan or base compartment, and the regulation of the heat provided will give hot water, boiling water or steam as may be required. The upper sterilizing chamber is double walled and is equipped with two wire-mesh racks for supporting the instruments. Steam from the lower chamber may be admitted into this sterilizing chamber by turning an indicator valve, or the steam may be shut off and the air in the chamber heated indirectly from the steam by conduction. This feature is of particular advantage in sterilizing bandages and dressings, as the sterilizing chambers can be raised to the boiling point before the steam is admitted, thus avoiding the condensation of steam on the articles being sterilized. The lower or water chamber may be used for hot or boiling water sterilization. The size of the sterilizing chamber is ample for all needs of the operating room. The overall dimensions of the complete sterilizer are 17⅜ inches long, 8 inches wide, and 16½ inches high. It is constructed of heavy sheet copper heavily nickled and highly poslished. Each sterilizer is equipped with three indicating switches providing three heats.

The G. E. Foot Warmer is a portable device designed to give a moderate warmth as a foot rest, in rooms or offices not sufficiently heated or having cold or draughty floors. In the home it provides considerable comfort to persons of advanced age or of poor circulation. It is 10½ inches by 14 inches by 3¼ inches high, japan finish with a top of open lattice work of Grecian design.

THE NEW SINGAPORE WATERWORKS.

The first public works for the supply of water to Singapore were undertaken in the year 1857. They comprised an intake in the vicinity of the present Thomson Road Reservoir and a masonry conduit to convey the water to town. Mr. Tan Kim Seng generously contributed $13,000 towards the cost of this undertaking.

Alterations and extensions to these works were made from time to time, and pumps and distributing works were constructed in town prior to the year 1878, while in 1866 the masonry conduit was replaced by a cast-iron main, 24 inches diameter, laid along the Thomson Road.

The Thomson Road Reservoir, as at first constructed, was completed in the year 1868, but in 1894 it was enlarged by the construction of the present embankment at a point lower down the valley. A second line of cast-iron pipes, 24 inches diameter, was laid along the Thomson Road, and brought into use in the year 1898.

A further enlargement of the Thomson Road Reservoir was completed in 1905 by raising the embankment an additional five feet, thus making the maximum depth 26¼ feet, and the total capacity 1,003,600,000 gallons. This enlargement was necessary for the reception of the water brought in from the upper portion of the Kalang River by the Kalang Tunnel Works, which were completed in 1907, ensuring a minimum supply of 5,500,000 gallons per day.

The necessity for securing additional sources of supply was recognised in 1901, and in the following year Mr. R. Peirce, M. Inst. C.E., the Municipal Engineer, outlined the present scheme of extensions, which received the approval of the Government in 1904, actual construction being commenced in 1906.

The Works recently opened form the first portion of this scheme.

The Map shows the locality of the new works, and of the further extensions yet to be undertaken in the valley of the Seletar Stream.

The new Reservoir is known as the "Kalang River Reservoir," and has been formed by constructing an embankment across the valley of the Kalang River at a point near to the 6¾ mile, Thomson Road. The total catchment area contributing to this Reservoir is 3,007 acres, comprising 1,538 acres in the upper part of the valley (known as Kalang Valley Extension), and 1,469 acres in the lower part of the valley. The water collected in the upper part of the valley may be intercepted and diverted through the Kalang Tunnel into the Thomson Road Reservoir, or may be allowed to flow into the Kalang River Reservoir.

The top water area is 253 acres, the maximum depth 27 feet, the total capacity 845,000,000 gallons, and the available storage 211 days supply when delivering at the rate of 3,500,000 gallons per day, which is the estimated safe yield of this Reservoir in the driest season, making a total of 9,000,000 gallons per day in the driest season, including Thomson Road Reservoir supply.

The preliminary surveys for this Reservoir led to the selection of a site two miles lower down the Kalang Valley as a suitable position for the embankment, and a series of borings were made at that point to ascertain the nature of the subsoil. These borings were sunk through loose material to a depth of 85 feet without reaching a sound foundation, so the site was abandoned. Trial borings were then made on the present site, and indicated that a sound foundation for the puddle wall would be reached at a depth not greater than 60 feet, which was considered satisfactory.

The site of the embankment having thus been settled, arrangements were made for the purchase of the whole watershed above this site, the tenants and cultivators received notice to quit, and in due course their houses were demolished and all trace of human habitation was removed. The original route of Thomson Road, from the 6¾ mile to the 8 mile, ran along a valley which now forms one arm of the Reservoir, and a diversion of nearly 3 miles was made so as to keep the road entirely outside the catchment area.

Description of Reservoir Works. The earthen embankment is 1,260 feet in length, 238 feet in width at the base, and 30 feet high, and contains 140,000 cubic yards of material. The site of the dam was first prepared by removing the soft, loose top soil and mud to a depth of from 6 to 15 feet, after which the trench for the watertight puddle wall was excavated and filled with puddled clay; selected earth, dug from the adjoining hills, was then deposited on each side of the central puddle wall as it was raised above the surface of the ground, being well consolidated by watering and rolling. The embankment thus consists of tenacious hill earth thoroughly consolidated, with a continuous core wall of clay puddle, the latter being continued below the original surface of the ground to a depth sufficient to form a tie with watertight material at the base.

(*Continued on page 76*)

THE FAR EASTERN REVIEW

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SUN YAT SEN'S RAILWAY DREAM.

The remarkable vicissitudes of railway enterprise in China bid fair to be added to by the activities of Dr. Sun Yat Sen, the ex-President of the Republic. From the exalted pedestal of politics Dr. Sun has ostensibly stepped down into the arena of humble yet potent industrialism, and, making up his mind to bend his talents towards the material rather than the political betterment of his country, has decided to promote railway construction throughout the length and breadth of the land as the best means of profitably absorbing his effervescing energies. Rightly enough Dr. Sun sees more promise of national advancement through the agency of the iron horse than by means of the much vaunted instrument of political reform. That, of course, has been urged upon Chinese statesmen and officials for generations past by the best of China's foreign friends, but never have the Chinese been able to grasp in its full significance what systematised railway communication actually means to a virile country and people. Dr. Sun Yat Sen seems to do so. He has, however, had the distinct advantage of the experience of travel in many parts of the world, and particularly in America has he been privileged to learn what a tremendous force for industrial and general development the railway is. He has observed the rapid returns from pioneering enterprises in the wide expanses of the States, and he rightly dreams of similar successes in China. They should in reality be greater. He has seen and appreciated the enormous benefits accruing and derivable from rapid track laying in those districts where there is a demand for speedy communication and rapid transport, and he reasons that what has been done in America to open up the wildernesses and make them blossom can be done in China to a much more profitable degree in those vast, thickly populated and intensely cultivated provinces now being served by nothing more satisfactory than a river, a canal, or, as is the case in the major part of the interior, by deep-rutted roads or narrow paths passable in the best of conditions only by virtue of the utmost patience and the expenditure of unlimited time.

Dr. Sun is a convert to the rapidly laid track, and he seems to see in it the panacea for most of China's ills. Taking the cue from other lands he is arguing with his fellow-men that wealth not only comes from the soil but from the deeps below the soil, and he is urging them to understand that the development of mining, the establishment of factories and manufacturing concerns constitute the natural corollary of railway expansion. He, with impetuosity that is laudable, wants railways to be spread about the land as fast as they can be built. He realises, too, in addition to the sordid benefits accruing, that the death-dealing famines can be stayed in their wrack and ruin of human life and national vigour by an adequate system, and that system, he declares, he is bent upon introducing.

It is at present the idea of Dr. Sun Yat Sen that great trunk lines and provincial and inter-provincial systems, can be, and should be, built without Governmental interference. He aims at private control, or, at most, provincial control, and is developing a plan (which we hope to be able to present to readers and discuss at a later period) whereby private capital shall be employed to construct the lines with freedom from vital interference from Peking or elsewhere. From the provinces, therefore he must seek the franchises and from the Central Government the acquiescence and support with which to attract the capital; and once he has the inducements at his disposal it is his intention to invite foreign capitalists to consider the feasibility of the scheme he will then have to propound. The opposition which has been shown in the past to inter-provincial railway enterprises having emanated from the provinces Dr. Sun is determined to risk no such disastrous obstruction in the future, and his energies are being devoted as a preliminary to the guidance of the provincial mind to that point where antagonism and agitation will be stayed sufficiently long to enable the knowledge to insinuate itself that the country will eventually get something of vast and increasing value for virtually nothing. That is the bait which Dr. Sun will hold out to the provinces to secure their compliance. He will endeavour to make terms with capitalists to build and work the roads to their own profit, and, within a given period, to hand them over to China as going concerns, free of cost or encumbrance. And he hopes to succeed. He knows that the Chinese cannot find the capital to finance anything like the system he has in mind, and he has lived to realise that they cannot secure value for their money, even if they have an abundance of it to dispose of, when they try their own prentice hand on railway work. The salvation is in the aid of the foreign capitalist and railroad engineer, and though it will not be put to the provinces in so many bald words, that is what is meant. The critics and the agitators among the provincials will be silenced by the fact that after a given time they will acquire railways without having had to pay for them. At least, that is considered by Dr. Sun as sufficient inducement to secure their consent, if not their active co-operation, in pushing a utopian scheme through to the utmost limit of success.

The ex-President does not intend to satisfy himself with any half-baked or diminutive plan. He sees in his mind's eye a net-work of rails covering the great expanses of his country—the provinces interlaced, and the far-flung frontiers of

the west in touch with the sea-board on the east. Trunk lines will stretch from Shanghai to Canton and away out with the setting sun through Yunnan to Lhassa and curl round the extreme edges of the Lid of the World into Sinkiang; from Shanghai direct through the heart of the rich provinces of the Yangtze valley, branching off north-west through Szechuan to Tibet to link with the line from Canton at Lhassa and direct north to open the wealthy productive areas in distant Sinkiang, and there connect with the line coming from Tibet along the Western frontier limits; from Tientsin north-westwards to Mongolia to link up in Sinkiang with the trunk lines sweeping from Shanghai; from Tientsin north-eastwards through Manchuria and also through the eastern part of Mongolia. These are roughly the main lines Dr. Sun projects in addition to the trunk system now being laid down in the provinces. But Dr. Sun dreams of still greater conquests. He sees each province a model of internal communication, and aims at developing a connected system such as no country in the world possesses. To-day it is a dream; to-morrow Dr. Sun hopes to see it all a living reality. He has so far secured the consent of Kwangtung, Kwangsi, Yunnan and Kweichow provinces to operations in the southern section of the country, and he is now preparing to overcome any objections in the Central and Northern provinces. When he elaborates his plans he proposes to visit Peking to place the whole project before the President, the Cabinet and the Advisory Council, and if he can persuade the different factions congregating in the capital to sink their provincial differences in this great matter he will have accomplished what no other man has so far succeeded in even commencing, and his life will not have been lived in vain, even if he fails to drive one spike in the lines he has drawn upon his map as desirable and possible. But whatever the ultimate result of Dr. Sun's dream, certain it is that his efforts will awaken an immediate and wider interest in railway projects in the land, and it is quite possible that if the fever for communication sets in the many feasible and potentially profitable projects which have for so long been hung up in the atmosphere of doubt and disappointment will within reasonable time be revived and carried into effect. Without even thinking of touching the sparsely populated and mountainous regions of Tibet, the wide uninhabited areas of Sinkiang, and the barren deserts of Mongolia, there is a life's work in the Central provinces alone, and if Dr. Sun can succeed in accomplishing a tithe of what lays there to his hand he will have conferred an inestimable blessing upon his country and will have contrived a monument to himself of a more substantial and enduring character than he could possibly ever have expected to have come to him as a result of efforts in the political phases of his country's activities.

PHILIPPINE SUGAR

One of the most valuable official publications of the Philippine Government is the "Handbook on The Sugar Industry of the Philippine Islands" recently issued under the direction of the Bureau of Agriculture. This comprehensive treatise on the most important industry in the Islands, is of the greatest value and assistance in arriving at a fair knowledge of the conditions surrounding the cultivation and manufacture of sugar under the primitive methods still in vogue, and in furnishing the agricultural data necessary for basing estimates of production and manufacture under more up to date methods. The lack of accurate data based on intelligent observation was a great handicap to the government and those friends of the Islands, instrumental in aiding the passage of the Payne Bill through Congress, and gave strength to the arguments of the opposition whereby the measure was defeated for several years. The information now published in the Handbook, especially the report of Mr. Herbert Walker, on the "Sugar Industry in Negros," should have been compiled and issued ten years ago, as it was clear to all who had the best interests of the Islands at heart, that the only way to refute the arguments of the opposition, was to have a thorough official report on the Sugar Industry, from a responsible and competent sugar chemist, specially assigned to the work.

There is little doubt that sugar is the premier crop of the Islands, whose future prosperity will be determined largely by the successful exploitation of this particular industry. And yet while money was freely expended by the Bureau of Agriculture, in experimenting with all other crops, and a great amount of valuable literature published, the sugar industry was passed over and neglected until 1909. In a foreword to the Handbook, the Director of Agriculture, Dr. G. E. Nesom, says "the Bureau of Agriculture has had charge of La Granja Modelo, the old Spanish sugar experiment station in Negros, since 1903, but has been without adequate means or equipment to carry on satisfactory lines of field or mill work." While the political future of the Islands remains uncertain, and tariff questions relating to Philippine products imported into the United States continue a subject for debate, the local Government here cannot actively encourage the development of the sugar industry along the lines it most deserves." This bears the date of July 1911, two years after the passage of the Payne Bill, permitting the free entrance of 300,000 tons of Philippine sugar into the American market.

Are we to infer from this statement that the Insular Government, owing to the uncertain political future of the Islands, does not intend to further interest itself in the development of the Sugar Industry now that the Payne Bill is a reality? Such a statement would suggest that the Philippine government cannot promote the welfare of those under its charge, and is tantamount to a charge of subordinating the welfare of the Filipinos to the mandates of the beet sugar trust in America. The reasons given as to why the local government can not actively encourage the development of the sugar industry, can not be accepted, as it would constitute an indictment of the administration policy in the Islands. We can see no good reason, why the Philippine government should not do all in its power to encourage the one manufacturing industry that will bring the greatest prosperity to those under its charge, and our candid opinion is that Dr. Nesom's "Foreword." simply lacked careful editing. The publication of the Handbook in itself refutes the statement so carelessly made in its Foreword, so the reading investor may take heart and pass over to those pages which contain information of the greatest value. A short historical sketch of the Sugar Industry in the Philippines from the pen of Mr. Harold M. Pitt, makes interesting reading, and the chapter on "The Modern Cane Sugar Industry" is of great value to the native planter who desires to secure a fair working knowledge of modern sugar making and cultivation of his fields.

By far the most interesting and instructive portion of the book is that devoted to the "Sugar Industry in the Island of Negros." It is of particular interest, as it is the only treatise dealing entirely with sugar, which has been published since the American occupation, as the result of investigations by a competent authority. The necessity of this work as already stated had been emphasized time and again, and in 1908 the government detailed Mr. Herbert S. Walker of the Bureau of Science to this duty. Mr. Walker was stationed in Negros during the entire sugar campaign of 1908 and 1909. Equipped with a portable chemical laboratory he visited the various haciendas, and secured at first hand a wealth of valuable data on the soils, cane analysis, mill and sugar house control, and other important information which will serve for some years as a guide to the industry of the Islands. With the erection of the new central factories operated under expert chemical control, further valuable data will be forthcoming, to supplement the highly valuable work of Mr. Walker.

Mr. Walker's careful studies reveal the fact that Negros cane is the best in the world, giving the high average of 16.06 per cent in sucrose with an average low fiber content of 10.02 per cent. In Hawaii with the most careful cultivation, irrigation, selection of seed, etc, the best canes grown during the campaign of 1909, showed only 16.01 per cent of sucrose, and these had been in the ground twenty months before cutting. The fiber in the Hawaiian cane is given at 12.5 per cent on an average, with a maximum of 15 and minimum of 10 per cent. In Egypt the average sugar content of the canes is given at 14 per

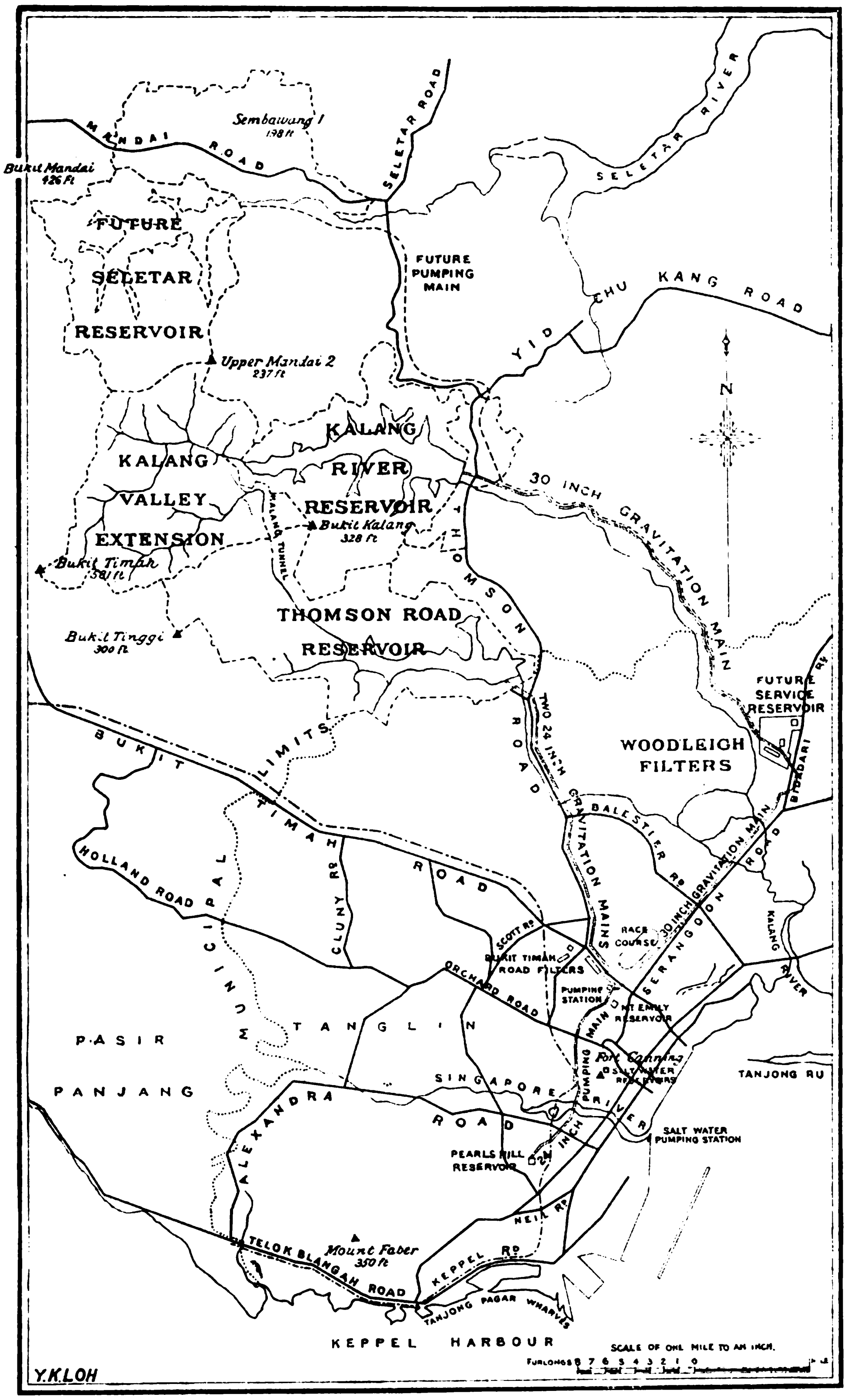
cent, and in Java the average is only 12.30 per cent, and 12.01 per cent of fiber. In Louisiana the sucrose in the juice averages 11.78 per cent and in the British West Indies 14.39 per cent.

This comparison establishes the fact, that nature has endowed the islands with the richest and best sugar canes in the world, with a sucrose content 25 per cent in excess of the average in some other parts of the world. If such cane is grown in the Islands without any attempt at scientific cultivation, there is reason to believe that under proper methods, a much richer variety can ultimately be grown. The Louisiana planter, struggling along with only 11.78 per cent in sucrose might well argue that the Philippine industry does not require official encouragement when nature has given the Islands an initial advantage over them of 33 per cent of sugar in the canes. And on the face of it, if we accept Mr. Walker's report as correct—it is official—the sugar industry in the Islands needs little encouragement. With a native cane free from disease containing 16.06 in sucrose and only 10.02 per cent in fiber, a modern factory should secure over 14 per cent in sugars on the weight of the cane, making the sugar industry in the Philippine Islands, under free trade with America, the most profitable industrial investment in the world to-day. If Mr. Walker's figures hold true, a modern sugar factory controlling its own lands, and paying the current scale of wages in the Islands, and selling its sugars to the refiners in America, should clear at least 150 per cent per annum on the capital invested. If Java, with cane containing an average of 12.30 per cent sucrose can develop an enormous industry, and market their sugars in America, paying the full duty of $38.00 gold per ton, and make an average 20 per cent on the investment, what should be the result in the Philippines, where the sugar content of the cane is nearly one-third greater, and there is no duty to pay. If there is any other industry in the world to-day that promises such great returns on the investment, we have failed to hear of it.

Mr. Walker's figures, if correct, constitute the greatest advertisement of the Islands yet published. We believe that the government should detail another chemist to go over the same ground, and compile a supplementary report, to check or verify Mr. Walker's figures. If other competent authorities corroborate Mr. Walker, the government after publishing the report can conscientiously refrain from any further active encouragement of the industry, for nothing it could do or say would surpass in importance this fact.

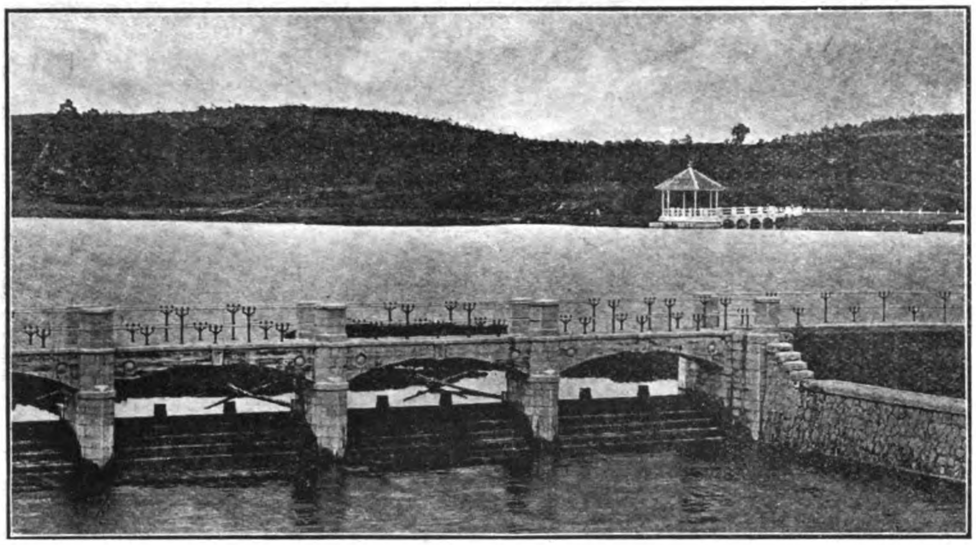
We have heard the statement repeated several times, that Philippine cane was vastly inferior to that of any other country. A few years ago, a sugar man from Hawaii spent some time in Negros, studying conditions. He claimed that there was hardly a cane field free from disease, and his report has spread amongst the sugar men of America, and is now a firmly rooted belief. Mr. Walker's report not only establishes the fact that Negros cane is superior to any other in the world, but emphasizes the point that very little damage has ever been reported as having been caused by disease or insects.

Mr. Walker also deals with the soil conditions of the Island, which compared with soils from other countries, are fully as rich, and under proper cultivation should produce as much sugar as those of any other country having the same climatic conditions. The analysis of the canes, with their high percentage of sucrose and low fiber content, explains why the Negros planter has been able to secure a juice extraction of 64.5 per cent on the weight of the cane, with mills averaging about 10 H. P. The best



SINGAPORE MUNICIPALITY

Plan showing Catchment Areas, Reservoirs, Gravitation Mains, Filters, Service Tanks and Pumping Station



SINGAPORE WATERWORKS: KALANG RIVER RESERVOIR

modern three roller mill working independently extracts an average of 68 per cent, and mills such as are employed in Negros about 50 to 55 per cent.

Where the West Indian planter working with a similar outfit, can only secure an average of 5 to 6 per cent in Muscavado sugars, on the weight of the cane, his antipodal prototype secures 10 per cent, in sugars on the weight of the cane, though at a polarization averaging 82 degrees. Nature has endowed the Islands, with soil and climate conditions which insure them a monopoly of the world's hemp supply, and scienti c research now discloses that Nature has still further blessed these Isles of the southern Seas, with the most favored lands for the cultivation of the sweetest sugar cane in the world. Truly, the Lord is good to the "Tao."

THE SINGAPORE WATERWORKS

(*Continued from page 72*)

At one stage of the work an unexpected subsidence of a portion of the bank gave some concern, but the construction of drains and the weighting of the toe of the dam arrested further movement.

Since completion, observations have been taken which show the settlement and consolidation of the dam to have occurred with satisfactory regularity, and to have amounted in twelve months to about 4 inches.

The puddle trench has been carried to a depth of 47 feet at its deepest point, and has a maximum width of 15 feet 9 inches. Steel interlocking sheet piling was used to support the sides of the trench during sinking, and at the time when the whole length of trench was open 500 tons of these piles were in use. Heavy and continuous pumping was necessary to keep the trench free of water. The object in view was to give the clay puddle a foundation in an impermeable strata, and this was effected throughout the whole length of the trench. At the South end of the trench granite was reached, the surface of which was cut out to form a groove for the seating of the clay puddle wall.

The clay for puddle was obtained from clay pits situated near the third mile, Serangoon Road. As it was rather soft it was mixed in a pug mill with an equal quantity of tenacious red earth before being placed in the trench. The total quantity of clay puddle used in the work was 25,000 cubic yards. The inner slope of the embankment is pitched with coral, bedded on laterite beaching.

The overflow from the Reservoir passes over a sill 190 feet long, and discharges through a byewash channel, 40 feet wide, into the old course of the Kalang Stream below the dam. A steel bridge was constructed to carry Thomson Road over the byewash channel.

The valve tower is provided with draw-off pipes at various levels, thus enabling water to be drawn always from the top, where it is more clear and pure. The water is passed through copper screens in the tower before entering the supply pipes.

The supply pipes from the valve tower pass along a tunnel driven through the hill round the north end of the dam. The tunnel is 520 feet in length and 11 feet in internal diameter. For the greater part of its length it is lined with cast-iron rings, of which 547 tons were used in the work.

The tunnel terminates in a meter chamber, where a 36-inch Venturi Meter has been fixed. The meter will show on a diagram the quantity of water drawn daily from the Reservoir.

While these works were under construction the whole of the area to be submerged was cleared of all trees, roots, and undergrowth, nothing but short grass being left on the site.

Water was first allowed to rise in the Reservoir in January, 1910; and, as it rose, large quantities of loose turf, or "sudd," floated up from the bottom, and had the appearance of islands floating on the surface of the water. This material was subsequently towed to the side of the Reservoir, cut up and removed.

The execution of these works necessitated the employment of a large staff, for whom quarters coolie lines, and hospital accommodation were provided. A temporary railway, 4½ miles long, was constructed from Serangoon Road, opposite Bidadari, along the pipe track up to the site of the Reservoir, and the bulk of the materials of construction was conveyed thereon.

Woodleigh Filters. From the Reservoir the water passes along 30-inch diameter cast-iron pipes to the land selected for the filters, which is near the 3½ mile, Serangoon Road, approached originally from the back of Woodleigh House, and is an irregular shaped hill, from which the surface drainage runs off in all directions. The site was inspected by Professor Simpson, C.M.G., and was very favourably reported upon. It is particularly suited for these works, is well isolated and can receive no drainage from surrounding properties.

The filters are "slow and filters," nine in number, having an area of nearly seven acres, and are capable of dealing with 4,000,000 gallons of water per day during the worst periods, and a considerably larger quantity during the best periods of the year.

Filtering Materials. The filtering material is placed in the filters in the following manner:—On the bottom of the filter a false floor is first constructed of two courses of bricks, laid honeycomb fashion. The false floor supports three layers of broken granite, coarse below, medium between, and fine stone above, upon which is placed a layer of sand, two feet in thickness, as the actual filtering medium.

The quantities of material required were very large, thus 1,720,000 bricks were used in the forming of the false floors, supporting 10,000 cubic yards of broken granite and 28,000 cubic yards of filtering sand, the latter obtained from pits at Tampenis and Changi.

All these materials were carefully washed and cleansed before being laid. The water for washing the sand is raised by special electrically-driven pumps to a small reservoir on a hill above the filters, whence it gravitates to the Walker washing-hoppers, of which two batteries of 12 each have been installed at the site of the works.

Method of Filtration. In operation, the unfiltered water enters the filters above the sand, and passes downwards through the filtering materials, the filtered water being collected into the outlet chambers and drawn off through floating outlet pipes, which, by means of an orifice in a drum attached thereto, automatically maintain a constant rate of discharge.

A filter should work continuously for periods of from four to eight days each, with 24 hours æration between each period. About once every three months a filter requires cleansing by scraping off about one half-inch from the surface of the sand.

The rate of filtration varies according to the character of the water and the time of year, the limits being 150 gallons per square yard per day as a minimum and 450 gallons per square yard per day as a maximum.

Woodleigh Clear Water Tank. After filtration the water is stored in the Clear Water Tank, whence it is discharged to the existing Pumping Station in Mackenzie Road through pipes of 39 inches in diameter.

The Clear Water Tank is divided into two portions to facilitate cleansing, and has a total capacity of 4,000,000 gallons, with a depth to overflow level of 9½ feet. Special care has been taken to secure efficient ventilation.

The daily discharge from the tank will be registered by a 30-inch Venturi Meter, which has been fixed on the supply main near the entrance to the works.

Near the site of the works permanent coolie lines, superintendent's quarters, and offices have been built.

Gravitation Mains. The water will be conveyed from Kalang River Reservoir to the filters by a main 30 inches in diameter, 3¾ miles in length, and from the filters to town by a similar main 3 miles in length.

Cast Iron Pipes have been used for all mains. Where laid across the swamps, the pipes have been carried on piled foundations, and protected with earth banking. Where laid beneath rivers, special foundations and concrete casing have been required.

The total weight of all Cast Iron Pipes used throughout the works is 7,000 tons, and of Sluice and other Valves, 100 tons.

These gravitation mains are designed to deliver to Town a quantity of 3,500,000 gallons per day when the Reservoir is at its lowest working level, and are capable of delivering much more at ordinary times.

The water will be delivered at the existing Pumping Station in Mackenzie Road, whence it will be pumped to the existing service Reservoirs at Mount Eamily and Pearl's Hill for distribution in Town.

Available Supply. The total cost of these works, excluding the purchase of land, has been $3,300,000, and the total supply of water now available from both old and new works is 9,000,000 gallons per day in the driest season. An additional supply of at least 3,000,000 gallons per day will be obtained from the works in the Seletar Valley to be constructed hereafter. Mr. Robert Peirce, M. Inst. C.E., the Municipal Engineer, was Engineer for the works, with Mr. Stephen G. Williams, Assoc. M.Inst.C.E., as Chief Assistant and Resident Engineer.

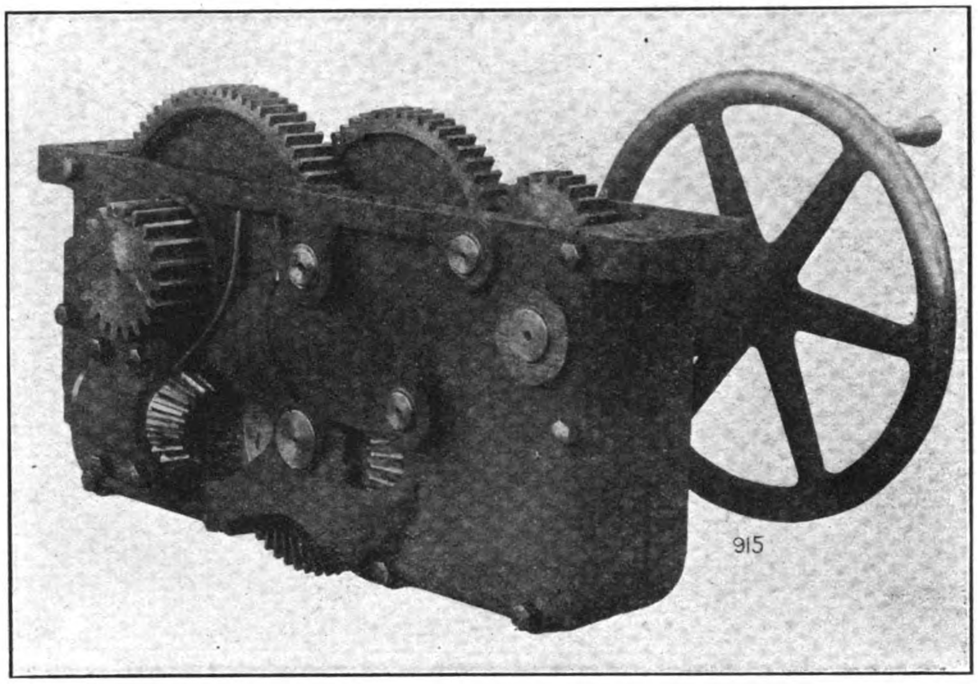
LODGE AND SHIPLEY HEAVY FORGE LATHE.

The lathe shown in the accompanying illustration has been recently designed by The Lodge and Shipley Machine Tool Co. Cincinnati, for the heaviest reductions in rough turning shafting and forgings. How well it accomplishes this may be judged from a recent performance, which is safely within the capacity of the lathe for continuous service, of reducing a .45 carbon steel axle 1⅛ inches on a diameter with 7/64 inch feed per revolution at a surface speed of 63 feet per minute. The lathe is unusually massive in all parts so that it will stand up to continued service of the most severe nature.

The actual swing over the carriage is 15 inches and the swing over the bed 30½ inches. The arrangement of spindle speeds is such that the lathe is adapted only for turning work between centers, that is, the speed range suits only diameters which will swing over the carriage. The spindle speeds regularly provide for turning at the rate of not to exceed 140 feet per minute on 3 inch diameters, and of less than 61 feet per minute on 15 inch diameters.

HEADSTOCK.—The headstock as shown is designed to receive a 30 horse power direct current variable speed motor, having a speed range of from 400 to 1200, but any type of motor may be applied and also greater horse power up to 40. There are two gear ratios which with the motor range of 3 to 1 give spindle speeds from 15.6 to 173 revolutions per minute. Any ratio of gearing may be provided to accommodate motors of higher speeds or to give the driving spindle any desired slower speed. The reducing of the spindle speed will of course increase the gear ratio. The driving gears within the headstock are of steel, and are hardened and heat treated. The lightest driving gear is 4 diametral pitch. The front spindle bearing is of large diameter and gives a projected area of 60 square inches. The spindle takes a bearing in standard composition metal replaceable bearings. All other headstock journals are bronze bushed. The back spindle bearing is also of large diameter and gives a projected area of 47 square inches. The machine is provided with a compensating face plate drive. Face plate is 22 inches in diameter and is made of steel, as are the dogs which act as drivers. These drivers can be adjusted radially on the face plate to accommodate driving dogs of various capacities and lengths. The driving shafts within the headstock are supported on both sides of the gears, thus eliminating all overhang. Forced lubrication is provided by pumped oil circulation for all of the driving gears, also for all of the journals, including the main spindle bearing and the thrust at the back of the spindle. The spindle is solid, and runs against a solid hardened steel plug at its back end to oppose the tremendous thrust of the spindle. The oil drains from the headstock bearings and gearing to a reservoir cast in the bed underneath the headstock, and is pumped from this reservoir by a positively spiral geared pump up to a reservoir at the top of the head, from which it is piped to the various bearings and gears. The centers are No. 6 Morse taper, and the one in the headstock is fitted into a hardened steel bushing forced into the spindle. The headstock is 48 inches long over all, and has the necessary gear covers to entirely enclose all the driving gearing. The machine will deliver, with a 30 horse power motor, about 19,500 pounds full at an 8 inch diameter of shaft and with a 30% overload of motor about 25,000 pounds. This would ordinarily create a pressure of 400 pounds per square inch on spindle bearing, but the driving pinion is so placed that the pressure of the cut is opposed by the driving pinion itself, consequently this amount of pressure per square inch is greatly reduced.

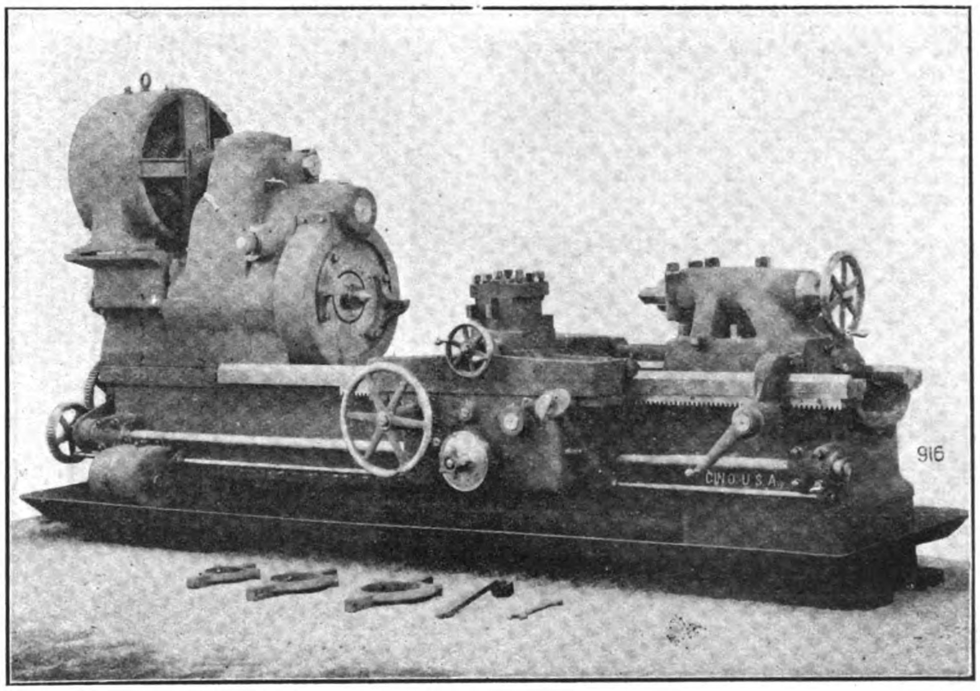
TAILSTOCK.—The tailstock arbor is of large diameter and length, and is reamed for No. 6 Morse taper. It is made of tool steel. The tailstock has long bearing on the bed, and a locking pawl engages a rack cast inside the bed. The screw for adjusting the tailstock arbor is of large diameter, and the total bearing surface of the tailstock on the bed is 120 square inches.



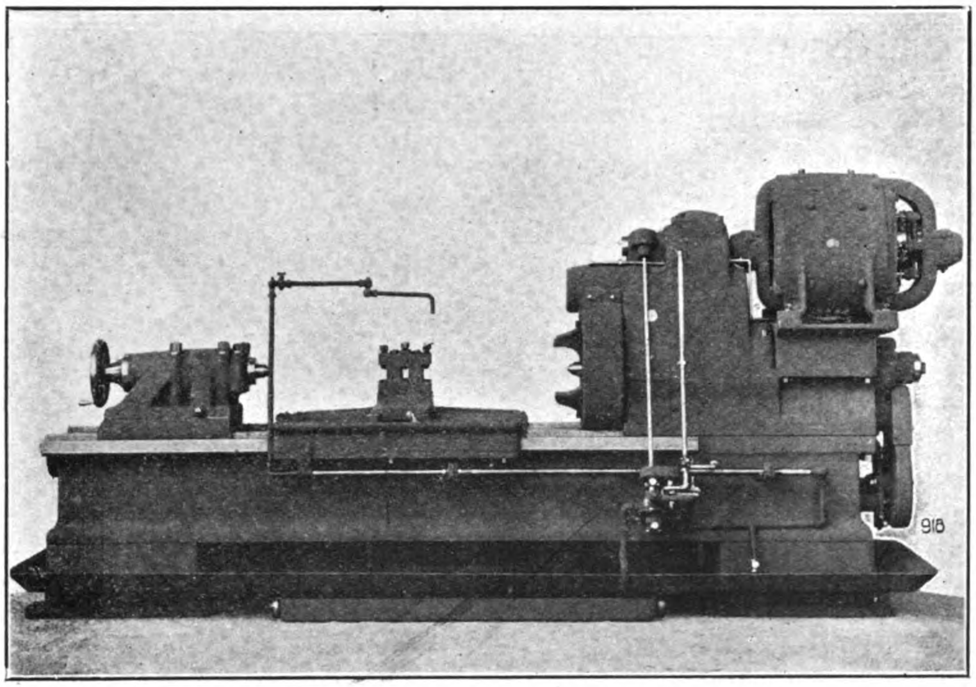
HEAVY FORGE LATHE APRON. REAR VIEW SHOWING COMPLETE BACK PLATE, ALL STEEL GEARS AND CENTRAL OILING STATION

APRON.—The rack pinion is unusually large in diameter and of wide face, and is made of high carbon steel. The smallest gear in the apron is 3½ inches in diameter, and the finest pitch used 5 diametral pitch. The smallest face of any gear in the apron is 1½ inches. All apron gears are steel, and all bearings are bronze bushed. The friction for locking the feed is placed on the outside of the apron to insure close inspection of friction faces at all times. The apron is double webbed, giving support at both ends of all studs. The hand wheel is 18 inches in diameter, and is geared so that one turn moves the carriage about ⅞ inches.

CARRIAGE.—The carriage is very long and thick. It bears its entire length on the bed, and the total area of bearing surfaces on bed is 245 square inches. It is gibbed both front and rear, and also under the inside V's. The bridge is extremely wide and strong, and the dove tail is inverted. The tool block is steel, and rests on a cast iron cross slide. It has one center slot to accommodate tools 1¼ inches × 2½ inches, and two open sides for tools of the same dimensions. Serrated and hardened tool steel plates are secured to the block to give the tool a long bearing. The cross slide is very long, and has 168 square inches of bearing surface on the top of the carriage. The cross feedscrew is of large diameter, and is placed as high as possible to resist the action of the cut. There is an oil trough cast entirely around the carriage, and this trough is placed below the inverted dove tail so that the lubricant from the cutting tool will not flood around the sliding surfaces. The carriage drains at the four low corners at its ends back into the drip pan under the bed. The cross feed screw hand wheel is 9 inches in diameter and equipped



HEAVY FORGE LATHE. GENERAL VIEW OF COMPLETE MACHINE



REAR VIEW OF HEAVY FORGE LATHE SHOWING DOUBLE PUMPS, ONE FOR THE LUBRICANT AT THE CUTTING TOOL, THE OTHER FOR OILING THE ENTIRE HEADSTOCK. THIS ILLUSTRATION SHOWS TELESCOPIC TUBING FOR LUBRICANT TO THE CUTTING TOOL

with two handles. A separate and very substantial pump is provided for the cutting compound, which is geared positively from the headstock, and this pump will deliver a ¾ inch stream of lubriceant to the cutting tool at the rate of 16 gallons per minute. Instead of the usual flexible tubing there is telescopic tubing, with proper stuffing boxes to take care of the longitudinal traverse of the carriage.

BED.—The bed is very wide at the top and unusually deep. It is mounted on cabinet legs, and has a heavy steel oil pan the entire length. This oil pan does not rest upon the floor, but is sufficiently clear of it to permit a cast iron drip pan mounted upon rollers, to be run under it. The lubricant from the chip pan is drained directly into the cast iron pan mounted upon the rollers, and pumped from this again to the cutting tool. This method separates the chips from the lubricant, and the chip pan itself is always comparatively dry. The front carriage "V" is very wide. The feed rod is of large diameter, and has two key seats diametrically opposite for driving a steel bevel gear in the apron. The rod is driven by plain change gears, and four changes of feed are provided as follows: 1/16, 3/32, 9/64, and 3/16 inches per revolution. The feed gears are steel, of wide face, and coarse pitch. The controller rod extends along the front of the bed, and is operated by a handle near the top of the carriage.

THE OXYGEN AND DRUM COMPANY'S WORKS AT NAN-MA-TEU SHANGHAI

OBJECTIVE.—The Company's aim in starting these works was to supply a long felt want in the matter of light convenient packages for containing oils and other liquids which would be accepted at low rates of freight and insurance by the Shipping and Insurance Companies. This is made possible owing to the complete absence of leakage ensured by the welding system adopted by the Company in their manufacture.

In order to be in a position to place these drums on the market at a price which will compare favourably with riveted and other drums, the Company have put down their own oxygen making plant. This also enables them to supply pure oxygen for outside purposes, such as the welding and cutting of metals, etc.

Up to the present, the fact that oxygen had to be imported from Europe greatly hampered the development of this process of welding in the Far East, but it is confidently hoped that now that oxygen and all the necessary apparatus are obtainable in China, the various Dock and Engineering Companies in Shanghai will soon follow the example of those in Hongkong and introduce this system in their works.

DRUM FACTORY.—This part of the building is replete with a range of machine tools for turning out rapidly and efficiently the various sizes of drums manufactured by the Company.

The drums are all welded by the oxy-acetylene system and are guaranteed perfectly tight. They are, for their size, very light and strong, and the body is corrugated with six corrugations which allows the use of comparatively thin metal and makes the finished drum very stiff. They are all fitted with a special type of bung which lies below the chimb of the drum and this can be efficiently sealed by the aid of a lead seal, sealing lugs being provided for the purpose.

The following are the weights and capacities of the respective sizes of drums at present manufactured by the Company.

Capacity in Imp. Galls	Style	Length	Diameter	Weight
24	Plain	30½"	18"	47lbs.
40	Corrugated	31½"	24⅛"	63 ,,
60	,,	33¾"	28⅛"	83 ,,
80	,,	36"	31⅛"	112 ,,

Owing to their lightness, strength and freedom from leakage they will be accepted at the lowest freight and insurance rates.

The Company are prepared to make other sizes and styles to suit the requirements of their clients, if ordered in sufficient quantities.

OXYGEN PLANT.—The oxygen making plant is designed to make pure oxygen abstracted solely from the atmosphere, and operates on what is known as the "Linde" system.

Besides the welding and cutting of metals, oxygen can also be used for medical purposes, oxy-hydrogen or coal gas lime light apparatus, etc. The Company guarantees the oxygen supplied by them to be over 98% pure, and it leaves the works in cylinders of various sizes to suit the clients requirements.

ACETYLENE PLANT.—The Company also supplies calcium carbide for the manufacture of acetylenes on ga the users' wno premises and for this purpose they have in stock several portable types of generators. They also supply the gas dissolved in acetone in cylinders for lighting, or for use with oxygen for welding or cutting purposes.

GENERAL.—The factory machinery is driven by two four cycle Diesel engines, one a single cylinder and the other a two cylinder, they both use petroleum residue as fuel. This is about one third the price of kerosene and, the engines use a smaller quantity of this per brake horse power per hour than the very best type of kerosene engine does of kerosene.

ASBESTOS-CEMENT-SLATES

The excellent qualities of this article have already acquired for it high repute and great appreciation throughout the world. The slates are made exclusively from Asbestos and Portland Cement and rank foremost among all building materials on account of their security against fire, their weather-resisting qualities, solidity, lightness, stability of volume, their sound-muffling and insulating capacities and their power of resistance against acidiferous atmosphere and vapours.

Asbestos-Cement-Slates are used for roofing as well as for covering walls and ceilings. They combine all the merits of natural and artificial products used for the same purposes without having their disadvantages and may thus be regarded as an ideal roofing and building material.

Their lightness of weight, incombustibleness, waterproof quality and bad heat conducting capacity have secured for Asbestos-Slates a very extensive use for building and fire proof purposes, for insulating electricity, heat and cold. As roofing it has particularly stood the test in an exceedingly satisfactory manner while under the influence of the tropical scorching heat of the sun, displacing natural slates on account of their high prices also tiles or corrugated sheet-iron owing to the serious disadvantages attaching to these.

In recent times Asbestos-Cement-Slates have also frequently come into use for School-Houses, Hospitals, Tropical Buildings, Airship-Halls, Warehouses and Automobile-Garages. In the circumstance it seems opportune to call the special attention of building contractors in this district to the ideal kind of roofing material.

HONGKONG'S BUILDINGS.

JARDINE, MATHESON'S OFFICES.

The Offices of Messrs. Jardine, Matheson and Company constitute one of the distinguishing features of Hongkong's architecture. The British Colony is famed for its fine piles of business houses, and as the years go by it has increasing cause to be proud of the substantial evidence accumulating in the shape of private and public buildings to testify to its prosperity.

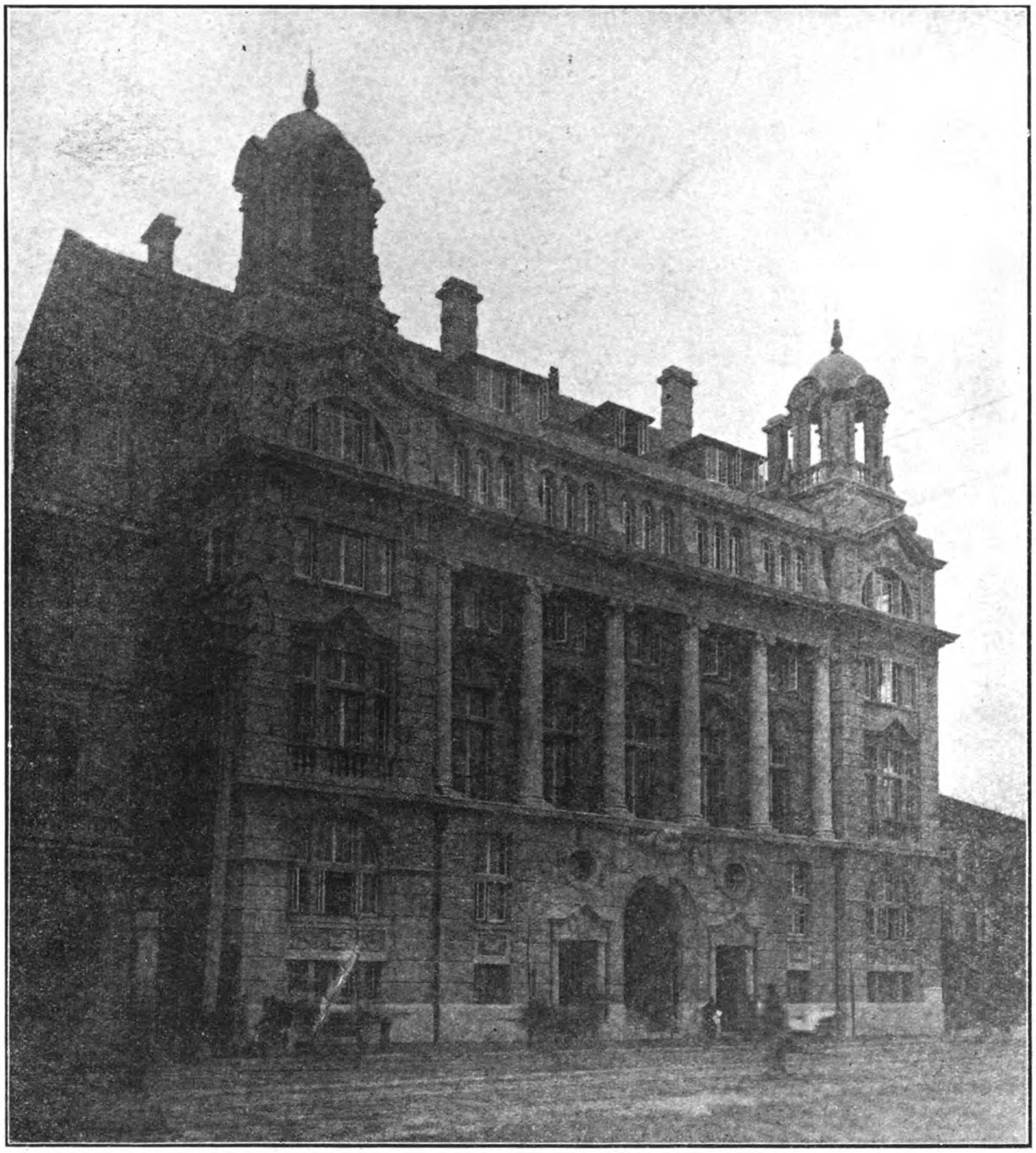
Distinguished in its commercial associations with the East the firm of Jardine, Matheson and Company has added to its prestige by the erection of the building illustrated on the opposite page. Situated in the busiest part of Hongkong it stands on the corner of Des Voeux Road and Pedder Street, and faces on the one side the new Post Office, on another the Hotel Mansions and on a third the Hongkong Hotel. It lends distinction to the group.

The main walls of the building are faced with Amoy brick on the outside, with cement plaster mouldings. The ground floor verandahs are of dressed granite, the walls above being plastered. The staircase is of granite, the floors of cement concrete and wood blocks, and the roof cement concrete covered with asphalt and flat tiles. Virtually the building is fire proof, the window and door fittings and office furniture and fittings being practically the only inflammable material used. Each floor has its own reinforced concrete fire-proof strong rooms, providing each department of the great business with its own safe custody for books and documents. The business offices are carried out in most modern style with special attention to ventilation and lighting, and the whole constitute a commodious business place of credit to the owners, and the designers,—Messrs. Palmer and Turner, architects,—and an ornament to Hongkong.

THE "EWO" HONG

New Offices of Jardine, Matheson & Co., Ltd., at Hongkong

SHANGHAI'S NEW BUILDINGS



THE SHANGHAI CLUB

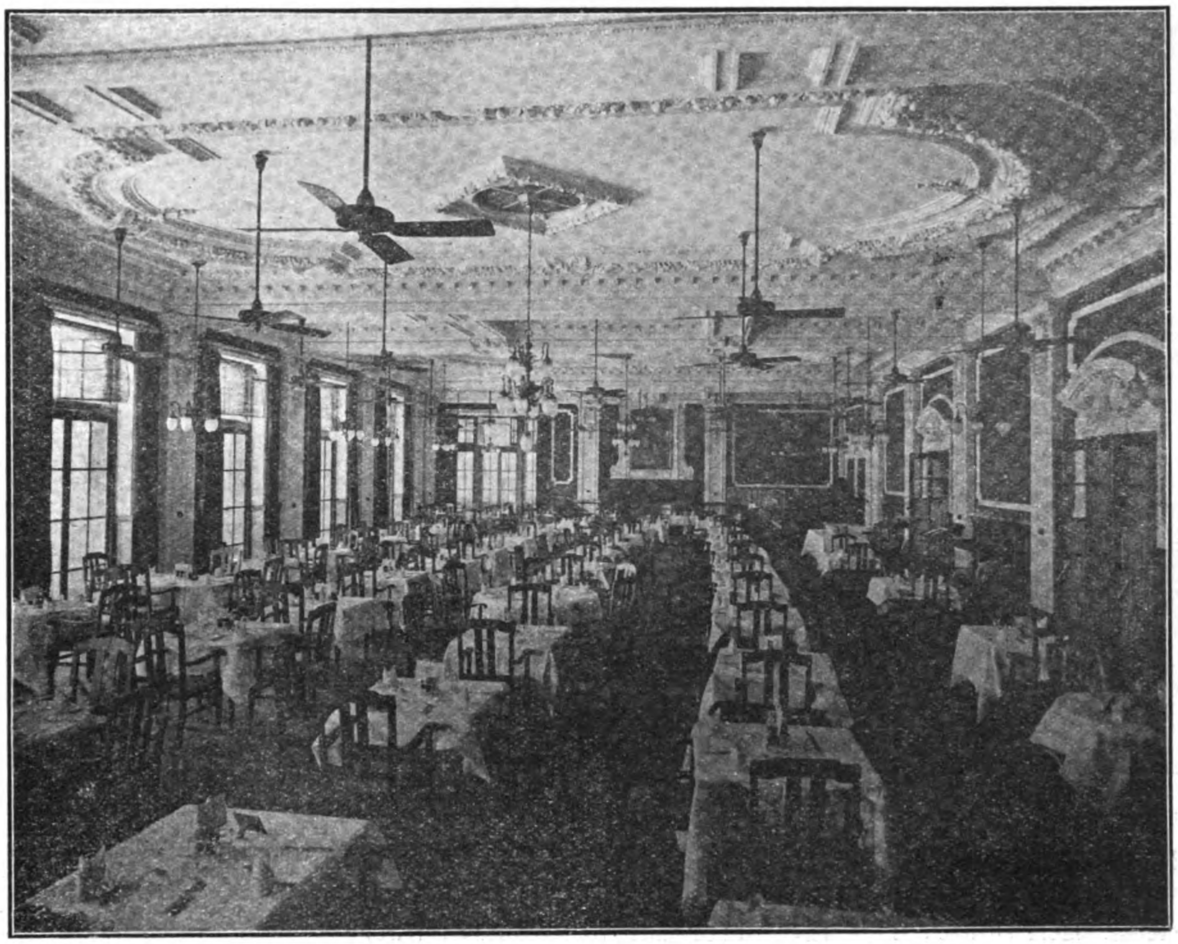
THE SHANGHAI CLUB BUILDING

The International Settlement of Shanghai strikes the visitor as a piece of Western metropolitanism dumped down in the East. Its modern buildings would be a credit to any Occidental city, and the Bund sweeping along the Whampoo River presents many striking illustrations of handsome architecture. One of the most imposing additions to the long line of well-designed buildings facing the river is the new Shanghai Club, in a rendering of the English renaissance style. The illustrations given herewith speak for themselves. The façade is carried out in ornamental stone, relieved by Soochow granite columns and plinth, whilst the walls are of concrete reinforced by steel stanchions and beams. The floors are also of of reinforced concrete, and in these respects the building is fireproof.

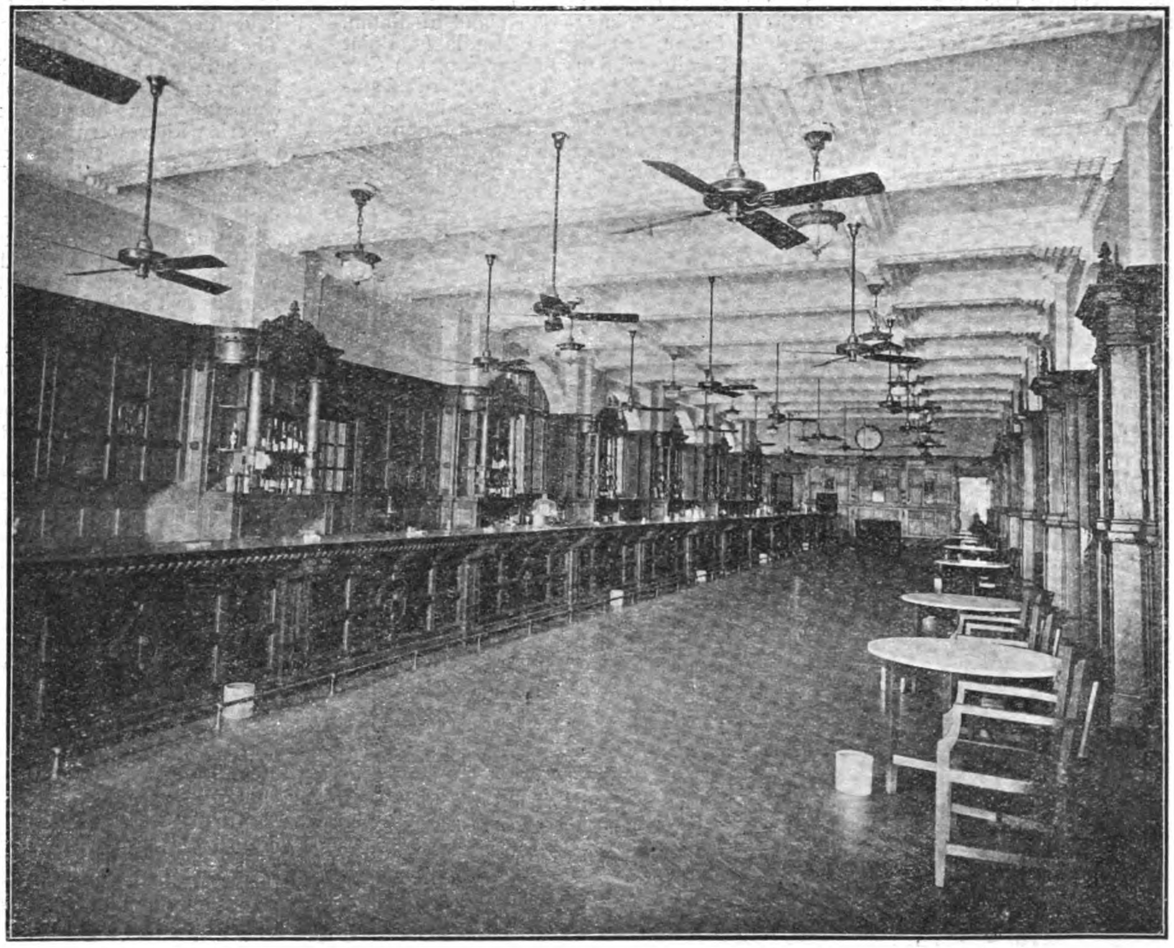
The interior of the Club is sumptuous. A broad flight of granite steps leads to a magnificent hall 90 feet in length, 39 in breadth and 41 feet 6 inches in height. Rising from a handsomely designed floor of black and white marble are magnificent Ionic columns 17 feet 9 inches high supporting entablatures and arches and surmounted by a heavy dentilled cornice and a baralled ceiling of glass. A balcony runs round the hall at the first-floor level, and is reached by an elegant white Sicilian marble staircase or by lifts, which also communicate with the higher floors containing the bedrooms.

To the south of the main hall is the largest bar in the East, carried out in the Jacobean style, panelled in oak. It is 110 feet 7 inches long and 30 feet wide. On the same floor is a billiard room, oak panelled, with raftered ceiling and leaded windows, the dimensions being 76 feet 6 inches by 29 feet 7 inches, a reading room in the "Adams" style 67 feet 6 inches by 30 feet, and a smoke room 36 feet 3 inches by 39 feet. The dining saloon is on the first floor overlooking the river, and is a magnificent room, 102 feet 4 inches by 43 feet 7 inches. The walls are panelled in a warm red, with teak dado. A large open fireplace at each end of the room is surmounted by a life-sized oil painting of the late King Edward and Queen Alexandra. There are three other dining rooms in the same floor, as well as the library, reading room, and a second billiard room, 76 feet 6 inches by 29 feet 7 inches, the walls being panelled in oak, the ceiling vaulted and the windows leaded. A card room is nearby. On the second and third floors are situated the bedrooms, there being 40, each being provided with bathroom and shower, on the fourth floor are the kitchen, sculleries and service rooms, all the walls being tiled. Rooms for the stewards and servants are on the same floor. Five electric lifts run between the service room and the dining room.

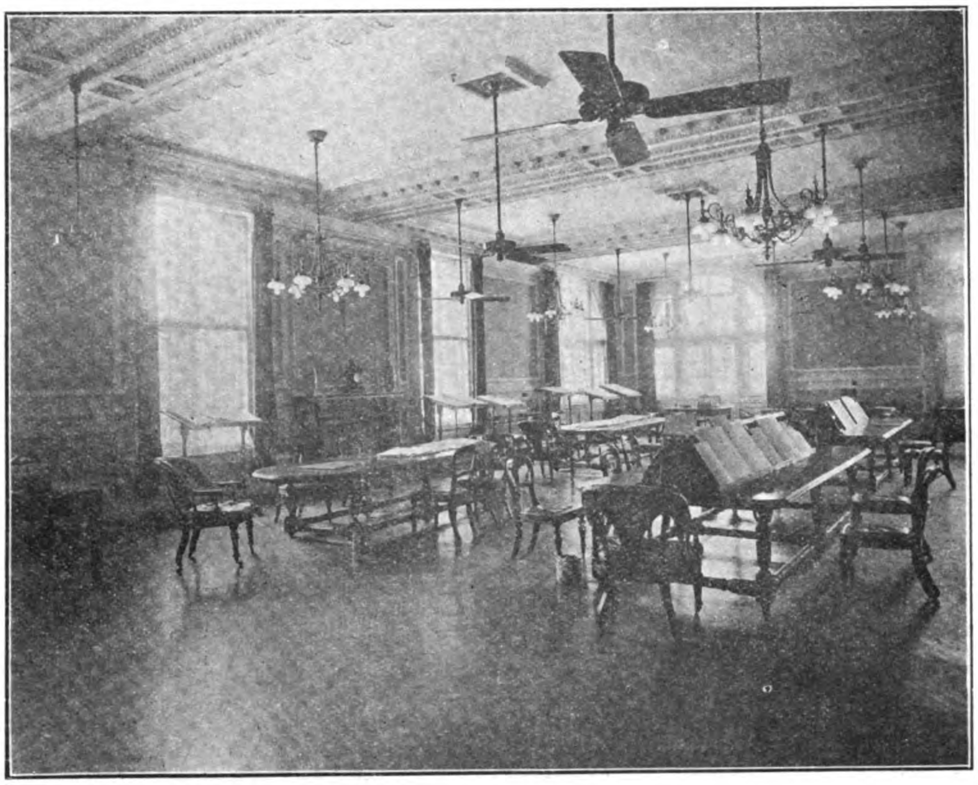
The building was designed by the late Mr. B. H. Tarrant, whose plans were accepted as the result of an open competition. Mr. A. G. Bray, upon the death of Mr. Tarrant, carried on the work for the firm of Tarrant and Morriss architects, and was responsible for the interior design and general completion of the building. The construction was in the hands of Messrs. Howarth, Erskine, Ltd.



THE SHANGHAI CLUB—DINING ROOM



THE SHANGHAI CLUB—THE BAR



THE SHANGHAI CLUB—READING ROOM

WIRELESS IN THE FAR EAST

There seems to be good reason to anticipate that the whole of the Far East will shortly be linked up by wireless. More attention is being given to this important subject than ever before and if proposals which are now under consideration bear practical fruit the day is not far distant when the Far East will be in touch with America on the one side and Europe on the other.

At the present time there are services operated by the Government of the Philippines, Japan, Netherlands-India, Russia, Germany and China. There is also a small British station at Cape D'Aguilar, Hongkong, but this is used exclusively by the Admiralty. In the near future,however, stations are to be established at Singapore and Hongkong. In the Philippines the usefulness of wireless was early recognised and in February last year the Philippines Wireless Board submitted recommendations relating to the institution and maintenance of a system of wireless telegraphy in the Philippine Islands. The Board recommended the establishment of fourteen wireless stations. Of these six were to be stations of high power to be erected at the following points:—(1) Island of Batan, north of Luzon, (2) City of Manila, (3) Point near the Straits of San Bernardino, (4) City of Cebu, Cebu Island, (5) City of Zamboanga, Mindanao; (6) Point near Davao, on Southern coast of Mindanao. Stations of intermediate power, capable of maintaining communication with the nearest high-powered station, it was recommended should be established at Baguio, Luzon; Tacloban, Layte; Iloilo, Panay; Cuyo, Cuyo Island; Puerto Princesa, Palawan Island; Dapitan, Mindanao; Malabang, Mindanao; and Jolo, Jolo Island. In addition the Board recommended that at some future time low power stations capable of maintaining communication with the nearest established station, be installed at twenty-eight other points. An appropriation of P 30,000 was recently authorised for the reconstruction and repair of the wireless stations in Mindanao. At Zamboanga P 15,000 is to be expended, P 4,000 for the erection of a new station, P 2,500 for employees' quarters, P 1,000 for a new atenna, insulation, etc., P 4,000 for a new generator, P 2,000 for a new transformers, and P 1,500 for new instruments, switchboard, etc. The Philippines Commission has appropriated P 145,000 for wireless telegraph stations in the non-Christian provinces. These stations are for the use of the Insular Government and the army and navy. The money will not be spent, however, until a similar sum has been appropriated by the United States Congress. Trans-Pacific facilities are also contemplated. The Western Union has announced that it has entered into a traffic agreement with the Marconi company, which provides for the extension of the Marconi system from the Pacific Coast of the United States to Hawaii, China, Japan and the Philippines.

The Japanese Government has stations at Osi Saka, Gota Island; Tailienwan, Port Arthur; Keelung, Formosa; Nagasaki, Sasebo, Choshi, Shimonoseki, Tsunoshima and Otchishi. Some of these stations take naval messages only.

The Netherlands-India Government has stations at Sabang, Sitoebondo, Balik Papan and Timor Koepang, while a fifth is in course of erection at Amboina. The first named has a range of 1,000 miles and is thus within reach of Colombo and Singapore.

Russia has two stations at Vladivostok. Though for ordinary purposes northern and western Siberia would not be considered to be within the geographical limits of the Far East, yet wireless laughs at map-makers and Russia's wireless intentions in this regard have their interest for this part of the world. The Duma is to be asked to provide $515,000 for building radiotelegraph stations along the Kara and White seas to secure telegraphic communications between northern and western Siberia with western Europe via the Arctic Ocean.

Germany has stations at Tsingtau and at Angauar and Yap in the Caroline Islands.

China has a commercial station at Shanghai and small Government stations at Peking, Tientsin, Paotingfu, Hoihow, Chuwen, Canton and Kowloon. It is stated that it is proposed to link up Peking and Lhassa, with repeating stations at Tachienlu and Batagg. A coastwise system of twelve stations from Hainan to the Gulf of Pechihli has also been mentioned. An excellent Open Letter addressed by the writer who employs the pen-name "Putnam Weale" to the Government of China, deserves to be noticed. Mr. Putnam Weale, after commending the Minister for Communications for reducing the domestic telegraph rates, points out that the adoption by China, as a business undertaking, of the Marconi wireless system is the only possible means of modifying the present state of affairs which effectively isolates China from close daily contact with the rest of the world. It seemed certain that very shortly India would be in direct communication through a chain of stations with England. China had now a unique opportunity. Her territory extended to within 205 miles of the Afghan frontier. If she established powerful stations on her extreme Western frontier she would be able to link up with Europe. Mr. Putnam Weale suggests that the Marconi Company should have official approval to organize a subsidiary Chinese Company to construct and equip stations, which would be taken over by the Central Government when they were in working order. This suggestion stands out from among the hundreds with which the Peking Government is being inundated as eminently worthy of sympathetic consideration. Should it be adopted it will result in great material and moral benefit to China.

THE SHANGHAI CLUB—DOMINO ROOM

COPRA IN THE PHILIPPINES.

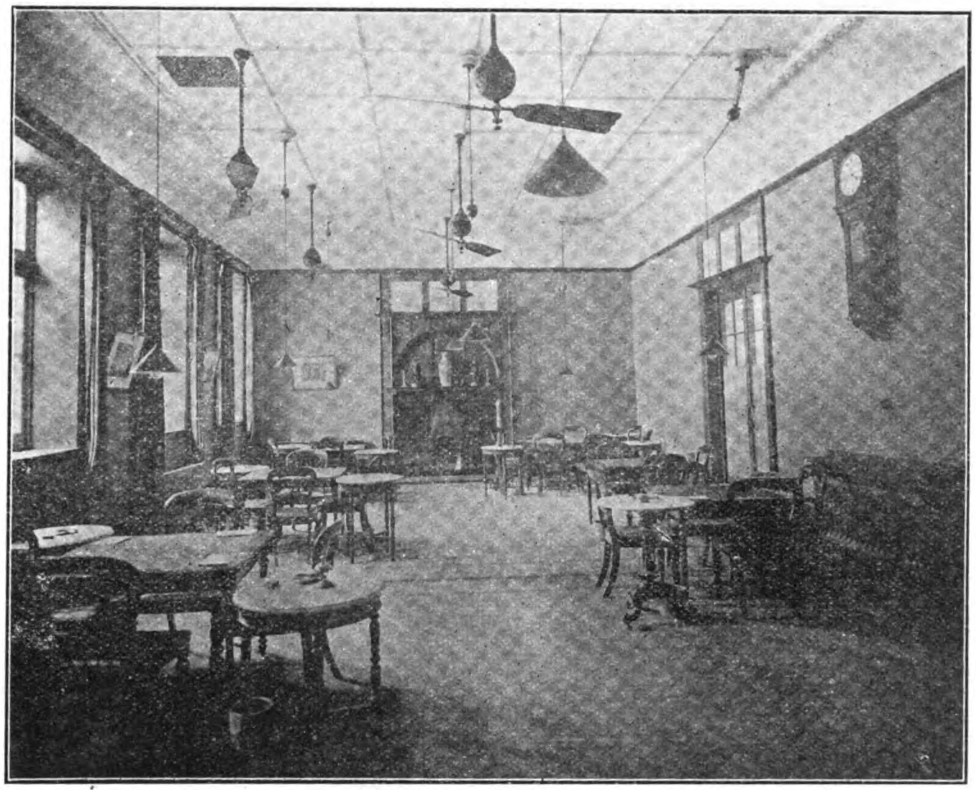
When it is noted that 120,000 tons of copra are exported from the Philippines annually it will be realized that this trade is one that deserves all the fostering care that can be given to it by the Government. The price paid for Manila copra is £23.-17.-6 per ton, while that realized for Malabar copra, which is considered the best in the world's market, is £26, c.i.f. continent. The Bureau of Agriculture has now under consideration the means of improving the Manila product so that it may command a price equal to that realized by Malabar copra.

The difficulty is that the kiln-drying process, which obtains in the Philippines, ruins the copra. It becomes permeated with smoke, and an odour and taste is left that cannot be eliminated by refining. The copra is poorly dried, except the Cebu product which is dried by the sun. The rest remains damp and the dampness causes the formation of black mould which eats away the oil and also tends to make it harsh and sour. Naturally the value of the oil and coconut oil cakes is reduced. There is also a loss in transit from deterioration, which is also due to improper drying. Mr. O. P. Barrett, chief of the experimental stations of the Bureau of Agriculture, holds that no time should be lost in standardizing their output so that the buyers will be able to count upon getting A1 material from them throughout the year. He points out that in several other countries, notably in Samoa, and to it a slight but increasing extent in Ceylon, the great advantage of driers is now recognized. It was a deplorable commentary on the progressiveness of the Filipino agriculturists that in the greatest copra producting country in the world there were no copra driers which were turning out a smokeless article suitable for the higher grade copra products. One rotary drier had, however, been recently ordered from Europe and several producers and dealers were now discussing the advisability of setting up modern drying apparatus. The steam or hot-water system, Mr. Barrett thinks, would have considerable advantage over the hot-air-pipe system because in the former case the copra could not be burned through carelessness or accident. The fuel in either case would be husks and shells and the running expenses of such a plant would practically be only the labour employed in charging and emptying the trays of the oven.

There seems every prospect of this important matter being seriously taken up by the Bureau and consequently there is an excellent prospect of Manila copra ranging up alongside of the Malabar product in quality and price.

MANILA AS A PORT.

The many excellencies of Manila as a port are known to those who have had the good fortune to visit the capital of the Philippines, but it has taken the steamship companies some time to develop a just appreciation of its possibilities. The fine steamers of the Pacific Mail Company, it is true, have long been callers at the port, and the Australian liners are regular visitors. There is also the local line between Hongkong and Manila, which comparatively recently passed under the American flag. But it was left for the Norddeutscher Lloyd to discover that Manila was "worth while" as a port of call for European liners. The energetic officials of the Nippon Yusen Kaisha have also under consideration a proposal for their steamers on the European run to call at Manila. One of the leading officials of the Nippon Yusen Kaisha recently visited Manila for the purpose of discussing the proposal with Messrs. Warner Barnes & Company, the agents of the N.Y.K. at Manila. Though no definite decision has yet been arrived at it is understood that the plan is regarded favorably and that there is a possibility that at the beginning of next year the N.Y.K. boats on the European run will make Manila a regular port of call. A considerable amount of cargo, both to and from Europe, is transshipped at Hongkong and it is thought that the new departure would prove profitable, more especially as the passenger traffic via Suez is growing rapidly. These proposals are an additional proof that those who in darker days prophesied that Manila had excellent prospects of developing into the premier port of the Far East, had good reason for their confidence.



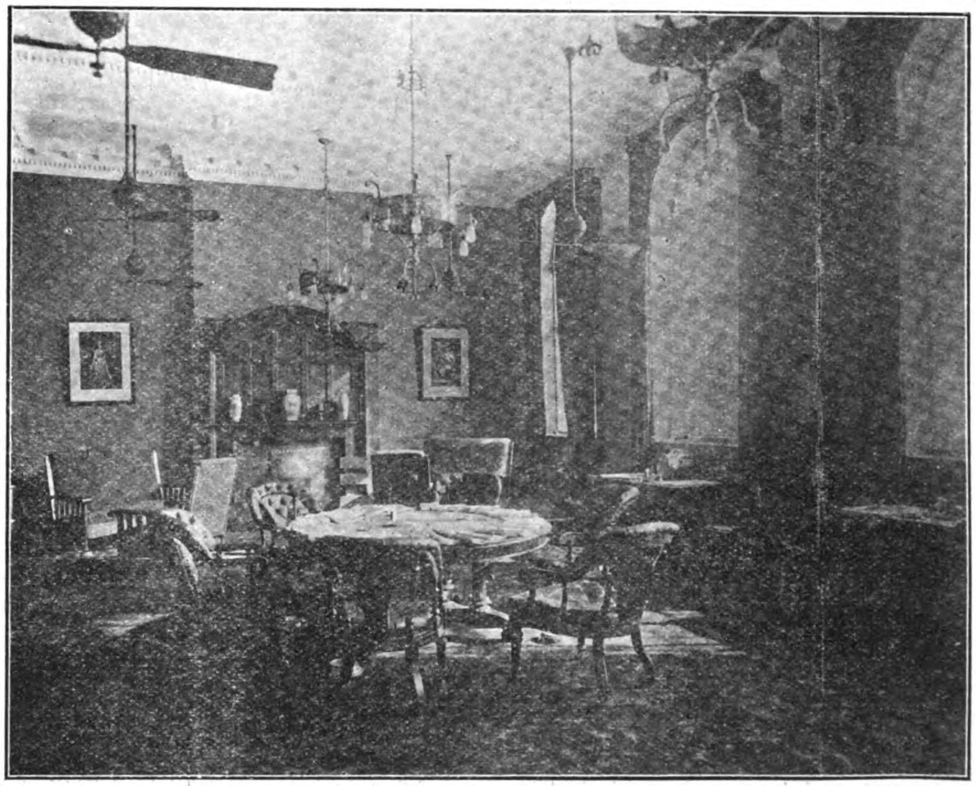
THE SHANGHAI CLUB—CARD ROOM

RUSSO-ASIATIC BANK

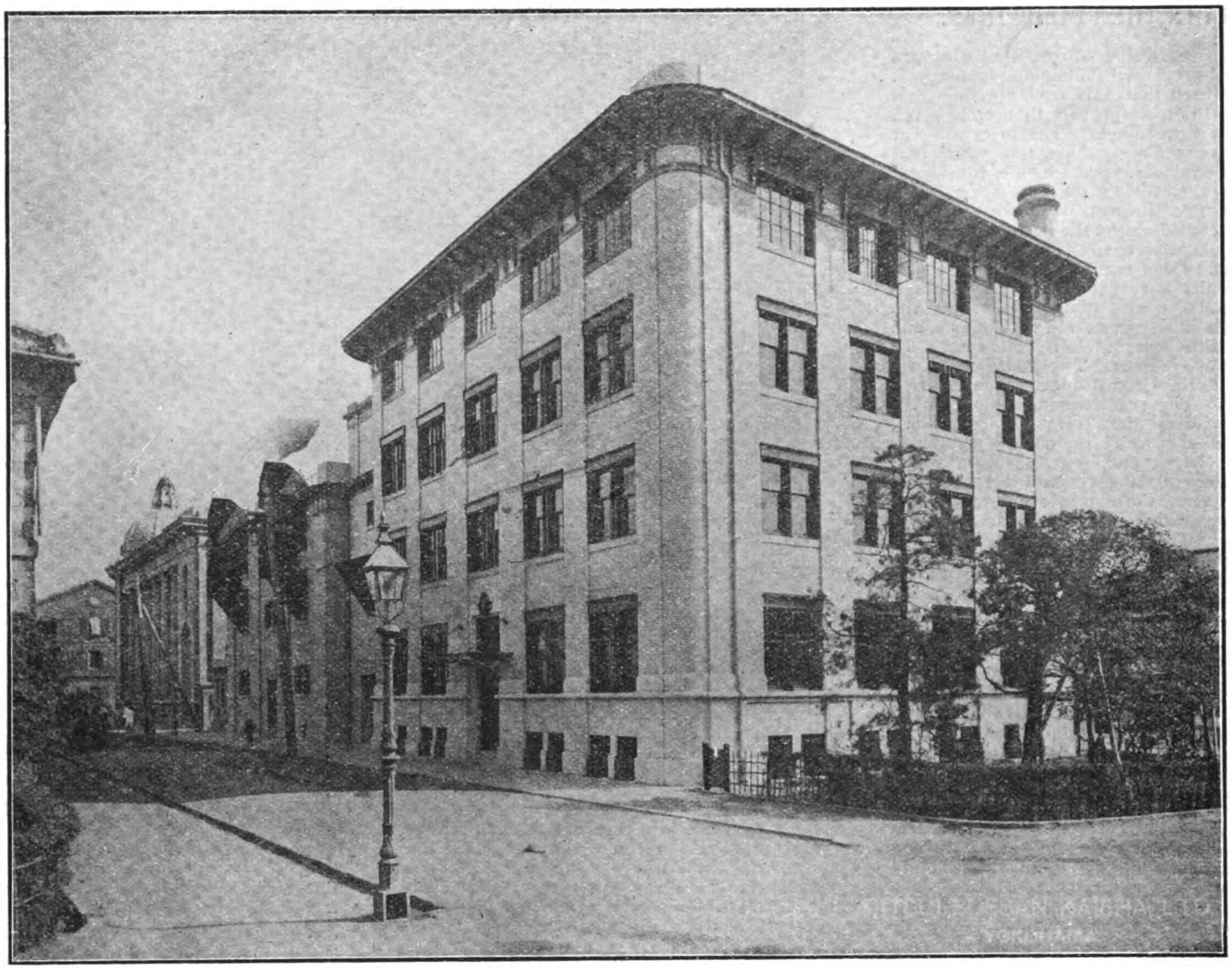
In accordance with a resolution passed at the General Meeting of Shareholders of the Russo-Asiatic Bank held in St. Petersburg in March 1912, the Russo-Asiatic Bank has offered, for subscription, 55,333 shares of Rbs. 187.50, face value, at the price of Rbs. 281.25.—These shares will participate in the profits of the whole year of 1912.

40,000 shares were reserved by preference to actual share-holders, in the proportion of 3 new shares to every 14 old shares.

13,333 shares were reserved by preference to holders of Founders Certificates of the Russo-Chinese Bank.



THE SHANGHAI CLUB—LIBRARY READING ROOM



THE NEW OFFICE BUILDING OF THE MITSUI BUSSAN KAISHA, LTD., AT YOKOHAMA

THE MITSUI BUILDING, YOKOHAMA.

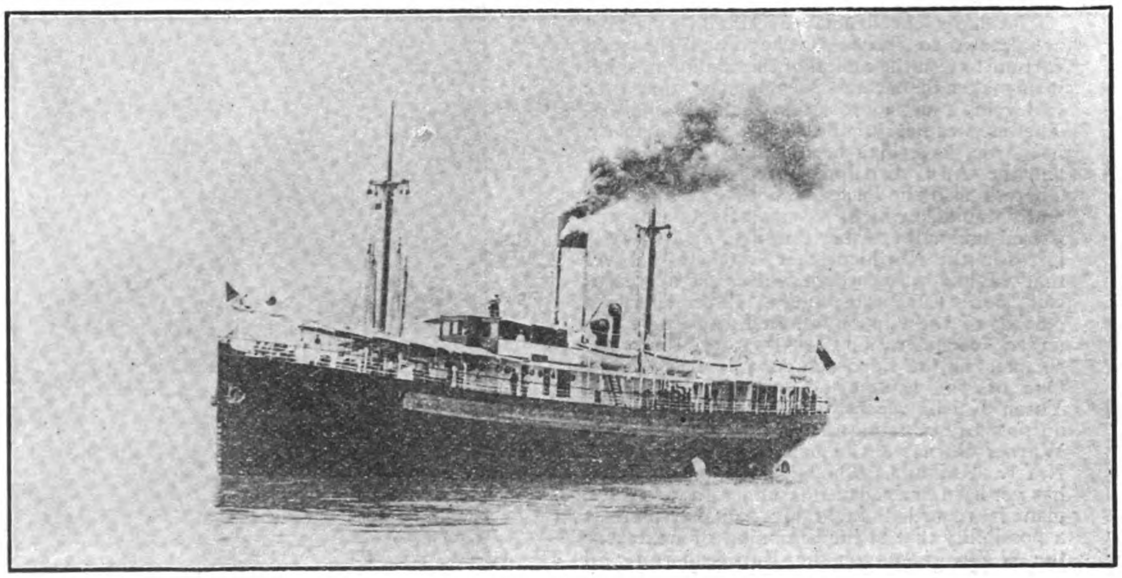
One of the latest buildings about which Yokohama can boast is the substantial and commodious office of the Mitsui Bussan Kaisha, situated next door to the Chartered Bank. Whilst not ornate from an architectural point of view it is imposing and particularly suitable to the requirements of the progressive firm for whom it was built. It is constructed of steel and concrete, the outside finish being of granite and glazed bricks, whilst the interior has been handsomely carried out iu Nara wood, glazed tiles, and moulded ceilings. The rooms are lofty, well lighted, and ventilated, and the whole building is steam heated. Mr. Endo Oto was the architect.

A NEW HOLT STEAMER

Built in the Taikoo Dockyard

The last addition to Messrs. Alfred Holt & Co.'s fleet of steamers is the Circe, which has been built by The Taikoo Dockyard & Engineering Co. of Hongkong, Ltd. The Circe is a finely modelled steel screw steamer 204 feet over-all by 31'-6" beam and 21'-6" deep to awning deck. Built to Board of Trade requirements for a passenger steamer, the vessel has been specially designed to meet the requirements of the Singapore-Deli trade. The 'tween deck gives a large space for the carrying of deck passengers, being well ventilated with openings in the sides of the vessel, and is also arranged for the carriage of horses. On the awning deck the saloon is in a midship deckhouse, on each side of which are several staterooms, all fitted up with the latest improvements and handsomely finished. The officers and engineers are accommodated aft in a steel deckhouse, the rooms being specially large and airy. The master's room is on the bridge deck, with chart room in front. The crew and petty officers are housed on the main deck.

The Circe is well equipped with life-saving gear, five large teak lifeboats and one cutter being fitted under davits. Steam steering gear is fitted in the engine casing, and a powerful steam windlass and stockless anchors have also been provided. The vessel is fitted with electric light throughout. The machinery consists of one set of triple-expansion, surface-condensing engines, steam being supplied from a single-ended boiler having a working pressure of 185 lbs. per square inch. A Cochran type donkey boiler is also installed for auxiliary purposes. On trial the vessel showed herself capable of maintaining a mean speed of 11½ knots per h our.



"S.S. CIRCE," BUILT BY THE TAIKOO DOCKYARD & ENGINEERING COMPANY, OF HONGKONG, TO THE ORDER OF MESSRS. ALFRED HOLT & CO.

COCONUT GROWING IN THE PHILIPPINES

By the Hon. DEAN C. WORCESTER, Secretary of the Interior, Philippine Government

GENERAL STATEMENT.

After fifteen years of observation on the ground in the Philippines, I have reached the conclusion that no branch of agriculture there offers such certainty of steady and assured returns from comparatively small investment as does the growing of coconuts, which may be raised to advantage as far north as Pangasinan, La Union and South and North Ilocos, and flourish in the Southern Philippines to a degree nowhere excelled and seldom equaled in other countries.

I have found it extremely difficult to obtain really reliable information as to cost of production and average annual value of crop. As a rule the Filipino has the vaguest ideas on these subjects: one man will tell you that his trees average ten nuts per year, while another will solemnly assure you that fairly good trees produce three or four hundred. The same lack of accurate knowledge is encountered when one endeavours to ascertain the cost of planting catch crops among the young trees and the presumable profits to be derived therefrom. It has, therefore, taken a very long time to gather the information which follows, but I believe that it is reasonably reliable and that the conclusions which I draw from it are conservative.

THE SELECTION OF SITES FOR COCONUT PLANTATIONS.

Soil and climatic conditions in many parts of the Philippines are ideal for coconut production. It should be remembered that the agricultural methods of the natives have violated every known rule. Seldom has the ground been really properly prepared for planting. The trees invariably stand too thickly. The Filipino cannot rid himself of the idea that the more seed he sows the greater will be his harvest. This theory, when applied to coconuts, results in the production of tall, spindling trees, producing half the number of leaves they ought to have, and bearing nuts sparingly, if at all. It is a marked case of a hard struggle for existence and the trees which lose out are often barren for years before they ultimately die, yet it is usually impossible to convince the owner of a plantation which is suffering from too close planting that he would be much better off were he to cut down half or two-thirds of his trees, selecting for elimination those which produce few or no nuts.

On the existing plantations trees frequently stand within ten feet of each other, or less, whereas thirty feet should be the minimum distance from tree to tree. As a rule, little effort is made to keep the ground under the trees free from brush after they reach the producing age, and it is by no means unusual to find forest trees competing successfully with coconut palms for light and air. Dead leaves are not removed, but are allowed to hang until they fail, and then slowly to rot on the ground. No effort is made to stop the depredations of the rhinoceros beetle, which in some regions is fairly abundant. In order to facilitate climbing, notches are carelessly cut into the bark of tender trees, often extending through into the wood. Wherever the lower surface of such a notch slants inward, water stands in it and this causes rotting of the wood. The vast majority of native coconut plantations suffer severely and needlessly from this cause. If those who gather the nuts were provided with the climbers used by linemen in ascending telegraph poles, they could go up and down the trees easily and safely without doing them the slightest injury. If notches must be cut, they should at least have their lower surfaces inclined downward and outward so that water will not stand in them, and great care should be taken not to cut through the bark.

COCONUT TREE IN FRUIT
SAN RAMON FARM, MINDANAO, P.I.

The present owners of coconut groves often neglect to harvest their nuts, which are allowed to fall and lie around on the ground. It is seldom indeed that effective means are taken to check the depredations of fruit bats, crows and monkeys, or to disturb the rats which not infrequently nest at the bases of the leaves and help themselves to the fruit.

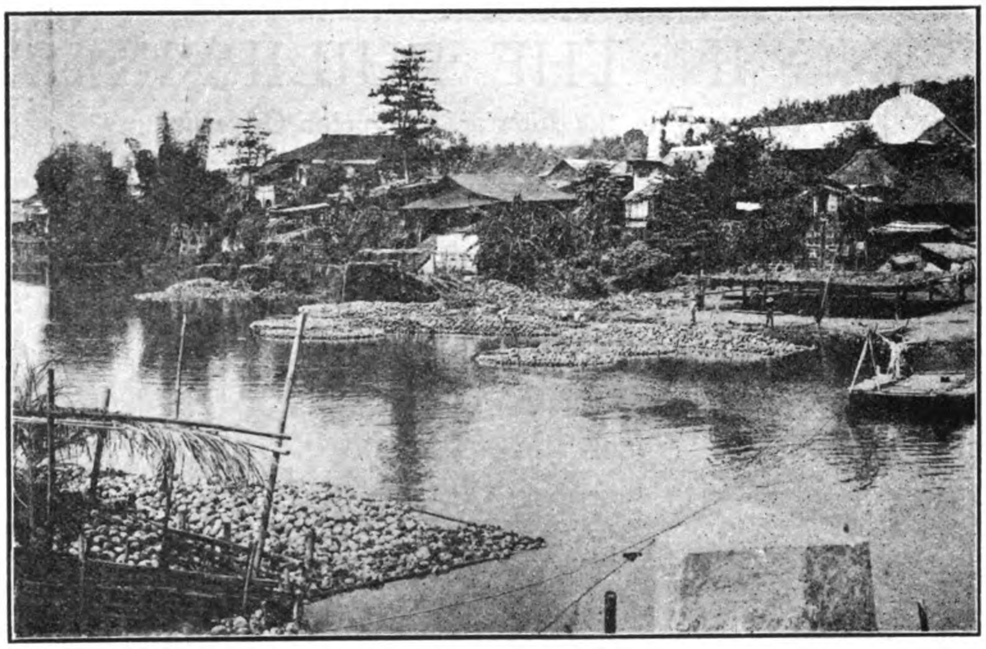
There are many very extensive plantations which produce no nuts at all for the reason that their owners prefer to tap the blossom stalk and make from the juice thus obtained a fermented drink known as "tuba."

Only in the rarest instances is any attention paid to seed selection, yet in spite of this carelessness and neglect the Philippine Islands produced during the fiscal year ended June 30, 1909, some 1,658,724 piculs, or approximately 231,787,050 pounds of copra, or dried coconut meat. This output excels that of Java, of the Straits Settlements, of Ceylon, or of the South Sea Islands, and places the Philippines at the head of the list of coconut growing countries. In fact, during the year mentioned the Philippines produced about one-third of the world's output.

A large amount of copra is consumed locally. During the year in question 232,728,116 pounds of copra, valued at $6,650,740, and 364,788 gallons of coconut oil, valued at $157,916, were exported. If this result has been obtained under the haphazard methods in vogue what

COCONUT GROVE, MANGALDAN, PANGASINAN, P.I.

DRYING COCONUT MEAT IN THE SUN, SAN RAMON FARM



COCONUT RAFTS IN PANGASINAN, P.I.

may be anticipated when due care is exercised in selecting suitable land, when it is properly cleared and planted, and when suitable cultivation is continued while the young trees are growing and after they begin to produce?

Soil and climatic conditions vary greatly in different parts of the Philippines and it is important in selecting a site for a plantation to know what to seek and what to avoid. Most authorities are agreed that a stiff, clayey soil is not favourable to coconut production, but I have seen perfect trees, bearing 100 or more splendid nuts each, growing in precisely this kind of soil. It is, of course, possible that there may have been an underlying layer of more friable and permeable soil, but the existence of these magnificent trees growing in clay conclusively demonstrates the fact that it is unsafe to conclude, from apparently unfavourable surface indications, that a given piece of land may not produce coconuts to great advantage.

Other authorities inveigh against a very sandy soil as being unsuited to coconut growing, and go so far as to state that every grain of sand in excess of what is required to make the soil fairly permeable to water is a positive detriment, yet the finest coconut trees that I have ever seen stood in pure beach sand, so poor that it would hardly grow either grass or weeds, and so destitute of plant-food that a careful chemical analysis failed to reveal the presence of any at all!

Trees growing in sand close to the sea naturally never lack for water, and all authorities are agreed that coconut trees need an abundant supply of water at all times, It is equally certain that they are prejudiced by the presence, in their immediate vicinity of *stagnant* water, while in cases where the permanent water-table comes very near the surface of the ground their roots spread out just above it with the result that they fail to grasp the earth firmly and the trees are readily blown down by violent winds.

The saying so common among natives of coconut-producing countries that the trees will not flourish unless they can *see* or *hear* the waves of the ocean undoubtedly rests on a solid basis of fact. The greater the volume of water which daily flows up through the stem of the tree and evaporates from its leaves, the more rapid and vigorous the growth of the tree and the greater its productivity. Evaporation being intimately associated with the free circulation of air, it follows that sites which are fully exposed to the prevailing winds are best, unless those winds are so violent as to injure the leaves and dislodge the young nuts. Coconuts should, therefore, never be planted in inclosed and sheltered valleys, but the site selected for a plantation should be along the coast or on some open plain where the circulation of air will be impeded as little as possible. Regions which have especially well-marked wet and dry seasons are not favourable to coconut production, especially if the dry season be of long duration. While coconut trees are seldom killed by such droughts as occur in the Philippines, the production of nuts is often temporarily checked by drought in provinces where the dry season is especially long and severe.

There are regions in the Philippines where rain usually falls during every month of the year and they are especially favourable for coconut production. Rain maps of the Philippines, showing for each month of the year the rainfall conditions throughout the Archipelago, so far as they are known, may be seen at the Manila Observatory and information relative to the distribution and amount of rainfall in any particular region will be gladly furnished, if available, by Father José Algue, the Director of the Weather Bureau. It will be found that there are many regions where conditions as regards rainfall leave nothing to be desired.

While the coconut palm is admirably adapted by nature to resist severe wind storms and when standing in suitable ground is seldom uprooted by the most violent gales, severe typhoons will sometimes blow all of the nuts off trees, at the same time destroying the blossoms so that the resumption of fruiting will be delayed for a considerable period, while the violent whipping about to which the leaves are subjected in these very severe storms injures them even if it does not serve to detach them from the trees.

While typhoons do not prevent the profitable growing of coconuts throughout the Islands, there are extensive regions in Mindanao, Palawan, and the intervening southern islands where these storms are practically unknown, and it is well, in selecting a site for a plantation, to eliminate possible loss from this source by first studying the storm maps of the Philippines and selecting a region where typhoons seldom if ever occur.

In considering soil conditions, one should remember the old saying that *the proof of the pudding is in the eating*. Owing to the haphazard cultivation methods which have been followed, adult trees, demonstrating fully the capabilities of the soil to produce coconuts without cultivation, may be found in the vicinity of almost any available tract of land, and it is safer to consider *facts* than to be swayed by *theories*. However, it can be stated with entire certainty that soil conditions on the numerous flat-topped coral islands rising only ten or fifteen feet above sea level are most satisfactory. On such islands the permanent water-table lies near enough the surface of the ground so that the roots of coconut trees readily reach it, and the possibility of harm from drought is completely eliminated. The soil is so poor in the food required by ordinary plants and weeds that comparatively little cultivation is required to keep it clean. Mosquitoes do not exist on such islands as there is no opportunity for them to breed, and in general health conditions are ideal. Proximity to the sea insures that free circulation of air which is essential, and incidentally the complete absence of wild hogs does away with the necessity for fencing. The majority of those islands are uninhabited and the absence of human thieves is a factor of no small importance.

Insect pests which are sometimes to be feared on the mainland of the larger islands are also conspicuous by their absence, as are monkeys.

COST OF LAND AND AMOUNT OF SUITABLE LAND AVAILABLE FOR COCONUT GROWING.

It is sometimes possible to purchase from private persons land suitable for coconut growing, but it will usually be found more advantageous to purchase or lease from the Government. Under the provisions of existing law, an individual may not purchase more than 16 hectares (40 acres) of public land. A corporation may purchase 1,024 hectares (2,500 acres) but if authorized to engage in agriculture must, by its charter, be limited to the ownership and control of this amount of land, and persons who are members of a corporation authorized to engage in agriculture may not be members of any other corporation so authorized. The minimum price at which public land may be sold is 10 pesos per hectare ($2.00 per acre), In selling wild public land it is the custom of the Insular Government to charge the minimum price. Actual title to the land may not pass until after five years of occupation and cultivation. Payment may be made as follows: twenty-five per centum at the time the bid is submitted; the balance upon the making of the award; or it may be paid in one instalment at the expiration of five years from the date of the award. Sums remaining unpaid after the date of the award bear interest at the rate of six per centum per annum from such date until paid.

The provisions as to leasing are more satisfactory. Either an individual or a corporation may lease not to exceed 1,024 hectares (2,500 acres). Leases run for 25 years with the right of renewal for an additional 25 years. The rental during the first period of 25 years may not be *less* than 10 cents per acre per year, and during the second period of 25 years it may not be *more* than 30 cents per acre per year. The rental is payable annually in advance.

There are in the Philippine Islands very extensive areas of unoccupied unclaimed public land suitable for coconut growing. Such land is especially abundant in Mindoro, Mindanao, Palawan, and the small islands adjacent to Palawan. Some of the latter offer very many advantages, such as the lack of necessity for fencing against wild hogs; the absence of monkeys; the absence of undesirable human neighbours; freedom from insect pests; free access to all winds; a permeable soil especially suited for coconut growing and the presence of the permanent water-table near enough the surface of the ground to make it certain that there will be no harmful results from drought after the trees are once well established.

The chief drawbacks are isolation and the absence of fresh water, which is lacking on the smaller islands. Rain water, sufficient for all domestic purposes, may, however, readily be caught. These islands vary greatly in size. A number of them have been ordered surveyed in connection with work necessary in surveying for several lease applications, and information as to their whereabouts and extent, and as to the whereabouts of land suitable for coconut growing on the larger islands above referred to, will be gladly given by the Director of Lands, or by the Secretary of the Interior.

TAXES.

In the provinces organized under the regular provincial government act, taxes on land and improvements thereon (by "improvements" are meant *buildings*, not growing crops or coconut trees) may not exceed seven-eighths of one per centum per annum, on what is estimated to be the true sale value of the property. In the provinces organized under the special provincial government act, namely the Mountain Province and Nueva Vizcaya in Northern Luzon, Mindoro, Palawan, and Agusan Province in the Island of Mindanao, taxes are one-half of one per centum per annum on the value of all real estate and personal property in excess of $100.00. In the latter provinces, therefore, coconut trees are taxable. They are usually appraised at $0.50 to $1.00 each. In the Moro Province the taxes are three-fourths of one per centum per annum on the value of all personal property, and real estate, including improvements thereon. Revaluations are made once in five years.

It is needless to say that the above remarks apply only to land which is actually owned by individuals and to the improvements thereon. Land which is rented from the Government is not subject to taxation, but the improvements on it are.

COST OF CLEARING FOREST AND BRUSH LAND.

The net cost of clearing forest land (by clearing is meant leaving it ready for planting) will obviously vary with the character of the forest, which may be such as to involve a larger or smaller amount of work in felling and burning trees, stumping, etc., and may give a larger or smaller return from merchantable timber and fire wood. The following figures are given by Mr. C. H. Lamb, Superintendent of the Iwahig Penal Colony, and are based on large experience. Mr. Lamb keeps strict account of all labour employed and charges it up at a daily wage of $0.25.

Felling trees, up to $4.00 per acre.

Cutting up trees and burning them, $2.00 to $16.00.

Stumping, $2.00 to $30.00.

First plowing, $0.60 to $2.00.

Mr. Lamb gives the following as a safe and conservative estimate of the average cost of clearing one acre of land:

Felling trees	$1.00
Cutting and burning	4.00
Stumping	8.00
Plowing	2.80
Total	$15.80

per acre. Under the most favourable conditions the minimum cost is estimated by him at $5.60 per acre.

The above sums represent gross expenditure. In some kinds of forest considerable returns may be expected. In Palawan, for instance, Mr. Lamb states that from 10 to 100 logs of good timber, which will net from $20.00 to $200.00, can ordinarily be had from a hectare of land, so that on such land there may be an actual profit from the timber cut, and the net cost should not exceed $8.00 per acre.

The following information relative to the clearing of forest land was given by Mr. J. H. Shipley, Manager of the Mindanao Estates Company plantation at Davao; one man can clear .05 of an acre per day of 12 hours, or an acre in 20 days. At $0.25 per day this would make the cost of clearing an acre $5.00.

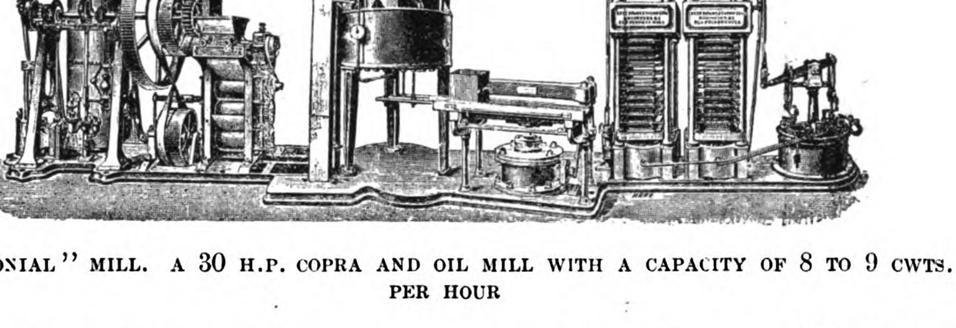
Mr. Frederick Lewis, formerly in charge of a hemp plantation in Davao, now Lieutenant-Governor of the Subprovince of Bukidnon, estimates the gross cost of clearing forest land at $15.00 per acre.

Governor Monreal of Sorsogon stated that 30 men would clear 250 hectares of land in a year. Estimating the number of working days at 300 and the daily wage at $0.25, this would make the cost of clearing that amount of land $2,250.00, which is equivalent to $3.60 per acre.

Mr. Cadwallader of the Cadwallader Lumber Company states that four men with crosscut saws will fell the timber on a quarter of an acre of heavy forest land in a day. With a daily wage of $0.25 this would make the cost of felling trees $4.00 per acre.

THE "UNIT" ANGLO-AMERICAN MILL, WITH SELF-SUPPORTING GEARING, FOR COPRA AND OTHER PRODUCTS. ELEVATION SHOWING, PUMPS, PRESSES, PARING MACHINE, PARING STONES AND KETTLE

Sr. Vicente Diaz, formerly Governor of the Province of Leyte, makes the following estimate relative to the cost of clearing land: 10 men in 2 days will cut the trees and brush on one acre at a cost of $2.00. After a month one man burns the ground over in one day at a cost of $0.10 per acre. The fire may continue to burn for three or four days. When it has burned out, 10 men go in and while some of them pile the half-burnt wood and clean the land well, others reburn it, at a cost of $1.00, making the total cost $3.10 per acre.



"COLONIAL" MILL. A 30 H.P. COPRA AND OIL MILL WITH A CAPACITY OF 8 TO 9 CWTS. PER HOUR

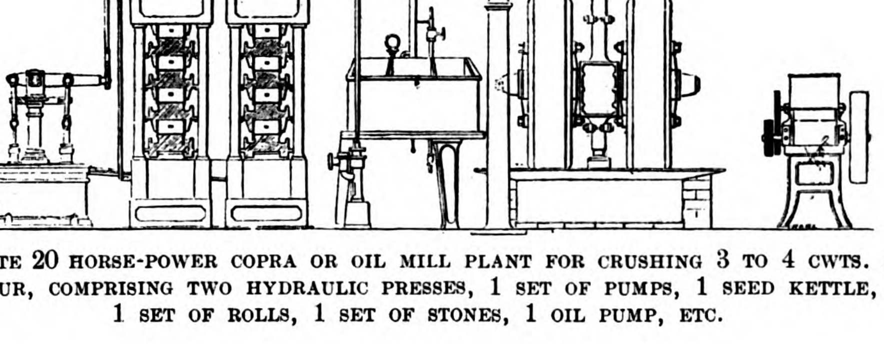
COST OF CLEARING GRASS LAND.

I have experienced much difficulty in getting reliable figures as to the cost of clearing grass land. I have often been assured that it was not necessary really to clear such land before planting coconuts and that it would suffice to take up the sod in the immediate vicinity of the trees, but a very serious objection to such procedure is found in the fact that trees planted in this way are exposed to the risk of total destruction by fire. During the dry season cogon grass is highly inflammable and coconut trees are very readily injured by heat. Furthermore, my own observation is that for at least three years coconut trees seldom do well when planted in grass land which is not thoroughly plowed.

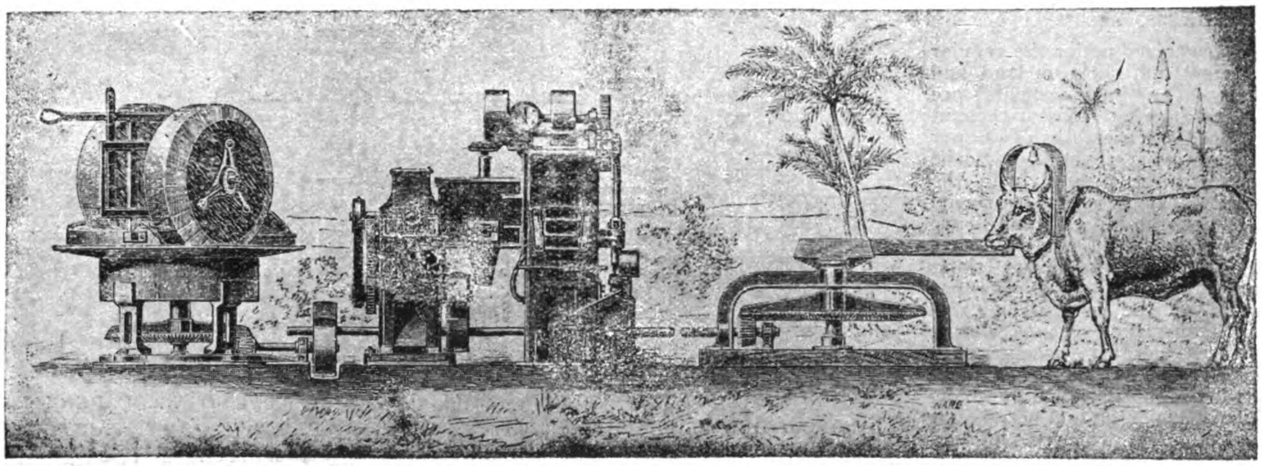
Most of the unforested land suitable for coconut planting in the Philippine Islands is covered either with the tall, coarse grass known as cogon or with a species of bamboo grass which closely resembles sugar cane in appearance, cogon grass being by far the commoner of the two. In order to clean cogon land the grass must first be thoroughly burned off and the land must then be plowed and harrowed repeatedly so as to get rid of the roots. If this is not done the cogon will promptly re-establish itself. If native plows and harrows are used, the land must be gone over four times the first year and the minimum cost will be $2.00 per acre. It should be gone over twice during the succeeding year at a minimum cost of $1.00. This cost is based on the employment of one native, with two carabaos, a plow and a harrow, for each eight acres of land, the native taking the catch crops which he raises as pay for his work, so that the cost is represented by the deterioration of animals and tools.

COST AND VALUE OF CATCH CROPS.

According to Superintendent C. H. Lamb, planting with corn or rice will cost from $0.80 to $2.00 per acre. In Palawan the minimum returns received from an acre of land is 8 bushels of rice, the average maximum is 20, although 30 is not uncommon. The average value of the unhusked rice is $1.25 per bushel



COMPLETE 20 HORSE-POWER COPRA OR OIL MILL PLANT FOR CRUSHING 3 TO 4 CWTS. PER HOUR, COMPRISING TWO HYDRAULIC PRESSES, 1 SET OF PUMPS, 1 SEED KETTLE, 1 SET OF ROLLS, 1 SET OF STONES, 1 OIL PUMP, ETC.



COMPLETE OIL MILL FOR COPRA AND OTHER PRODUCTS, CONSTRUCTED OF SMALL AND LIGHT PIECES FOR CONVENIENCE OF TRANSPORT
(Manufactured by Rose, Downs & Thompson, Ltd.)

giving an average return from the rice crop of from $10.00 to $25.00 per acre.

According to Mr. Lamb three catch crops may advantageously be grown. He recommends first a crop of corn and subsequently two crops of mountain rice, by which time the coconuts will be too large to permit further advantageous cultivation of rice or corn.

The second and third crops may give a profit or may only suffice to cover the cost of keeping the land clean and under cultivation, which is necessary in order that the young trees may make their best growth. It is obvious that as the roots of the coconut trees extend, the amount of ground available for cultivation will become less, while the growing tops will throw a constantly increasing amount of shade.

Sr. Vicente Diaz, formerly Governor of the Province of Leyte, estimates that four men will plant rice or corn on two and a half acres of land in a day. The cost of a bushel of seed, which is sufficient, is $1.25 and the total cost of planting is, therefore, $0.90 per acre. This crop is given one cleaning, which takes 10 men one day, at a cost of $2.50. The harvesting of the rice crop takes 10 men one day, at a cost of $2.50. The crop is estimated at 20 bushels, worth $1.00 per bushel or $20.00.

He estimates the crop of corn at 6 bushels of shelled corn per acre. It is usually worth $1.00 per bushel or $6.00 per acre.

According to Mr. C. H. Lamb, the first year's catch crop should yield a profit which should go far toward paying the cost of clearing the land and the second and third years should yield catch crops which will at least pay for the cost of cultivating the land. During the fourth, fifth and sixth years, by the end of which time the trees will have begun to bear, it will be necessary to keep the land clean and there will be no returns from catch crops. He states that the cost of such clearing will average $2.00 per acre.

Mr. Frederick Lewis estimates the cost per year of keeping an acre of land clean at $5.00.

Sr. Vicente Diaz estimates that 10 men can clean two and a half acres of ground in one day, at a cost of $1.00 per acre.

In general it may be said that where soil conditions are favourable for catch crops actual experience has shown that under good management they can be made to pay approximately the cost of the plantation up to the time the coconut trees fruit.

COST OF CLEARING MANGROVE LAND.

Special consideration must be given to mangrove land, as the returns from firewood and tan bark can, according to Mr. C. H. Lamb, invariably be depended upon to pay the cost of clearing and planting. Neither rice nor corn can be grown profitably on this land because of its character. Tapioca, peanuts, and camotes, or yams, can be grown upon it, but as the soil contains so much salt that ordinary weeds do not spring up within two years after planting, the usual, and probably the best, practice is to depend on coconuts alone rather than to attempt to raise catch crops. It must, however, be remembered that coconut trees planted on this land are not likely to produce so heavily as those planted on more suitable soil and that they are more likely to be uprooted during severe wind storms, as their roots strike the permanent water-table near the surface of the ground and will not go below it.

Referring in detail to the returns from this land,—one man will ordinarily cut 50 bundles of tan bark in a day. Each bundle is worth $0.10. One man will usually cut one-half cord of wood per day. Deducting the cost of transportation, this firewood will net $4.00 to $5.00 per cord on the Manila market.

Coconuts planted on mangrove land will, it is said, bear invariably before they reach the age of six years, and while such land can hardly be recommended for a coconut plantation any of it necessarily purchased in connection with other land can be utilized.

COST OF SEED NUTS.

Good seed nuts will cost from one to four cents each. Two and a half cents may be taken as a fair, average cost.

COST OF PLANTING.

The nuts should be sprouted in seedbeds before planting, and the net cost of placing them in the ground, including the cost of care while sprouting, is estimated at from 2½ to 5 cents per nut.

Under such conditions as prevail in the Philippines, nuts should be planted in straight lines 32 feet from each other in both directions. If planted nearer, the tops of the trees will ultimately overlap. This means 40 nuts to the acre, but as a certain percentage of nuts always fails to sprout, and as a certain additional number will make a weak growth at the start and it is best to plant only very strong growing nuts, 50 nuts to the acre should be allowed. The cost of planting an acre will, therefore, be approximately as follows:

50 seed nuts at 1 to 4 centavos per nut, $0.50 to $2.00.

Sprouting and planting 40 nuts at from 2½ to 5 cents per nut, $1.00 to $2.00; making a total of $1.50 to $4.00 per acre.

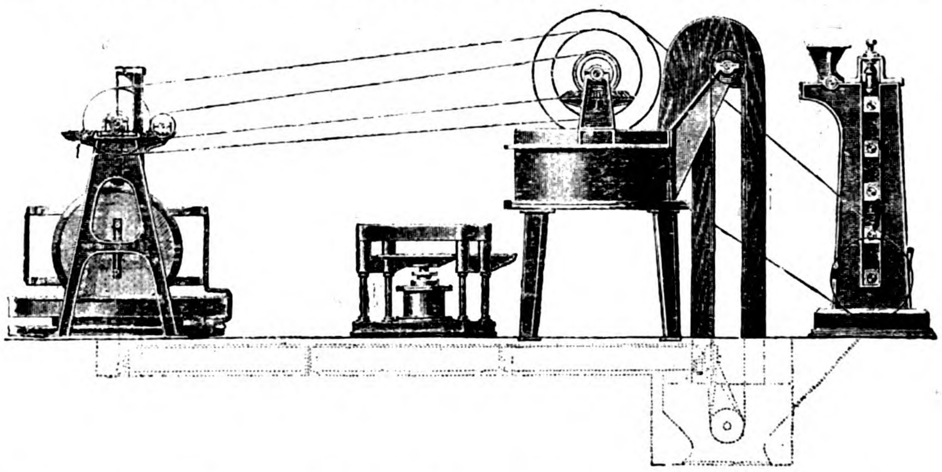
ANNUAL COST OF CULTIVATION AFTER FRUITING BEGINS.

According to a Bureau of Agriculture bulletin on coconut planting annual plowing should be continued during the life of the trees. On cogon land two plowings per year may prove necessary. These plowings should be relatively shallow but should be sufficient to turn under any green manures such as leguminous crops which may be grown to enrich the soil.

I have seen the value of plowing quite conclusively demonstrated on the coconut plantation of Sr. San Augustin, near Calapan, Mindoro. This is one of very few coconut plantations in the Philippine Islands where the trees are set out in straight lines and at proper distances. When I last visited this plantation. I noted that the ground had been plowed between the trees on one side of the highway while on the other side there had been no plowing but the grass had been kept very short by grazing cattle on it. The trees around which the ground had been plowed looked decidedly more flourishing and were bearing more heavily than were those where it had not been plowed.

IMPORTANCE OF FERTILIZATION.

Comparatively little attention has thus far been given in the Philippines to the subject of manuring or otherwise fertilizing coconut groves, but enough has been done to show that in this as in other branches of agriculture proper fertilizing pays. The drain on soil



"UNIT" MILL, END VIEW, SHOWING PARING STONES, MOULDING MACHINES, KETTLE, ELEVATOR AND ROLLS

fertility for 1,000 nuts, weighing in the aggregate 2,125 pounds, has been found to be as follows: nitrogen, 8¼ pounds; potash, 17 pounds; phosphoric acid, 3 pounds.

Dead leaves should be burned and the ashes scattered on the ground about the trees. Husks and shells should also be burned and the ashes scattered on the ground unless machinery is available for making coir, in which case it might be more profitable to utilize the husks for this purpose and to buy fertilizer as needed. Stable manures, press-cake, and tankage are all valuable. When none of these are available, one may sow and subsequently plow under pease, beans, or other soil-enriching crops.

RATE OF GROWTH AND FRUITING AGE OF COCONUT TREES.

The rate of growth and time before fruiting vary in consonance with the varying conditions of soil and climate. Trees planted near the sea coast in Palawan can be depended upon to fruit before they are six years old. I have seen trees four and one-half years old which were already well loaded with nuts. In many parts of the Islands trees do not fruit until seven years old. At considerable elevations above the sea fruiting may be delayed for ten or more years, and if one goes high enough the trees cease to fruit at all. It is always difficult to get really reliable information as to the age of young trees. Especial interest, therefore, attaches to the following statement furnished by the Superintendent of the Iwahig Penal Colony, concerning coconuts at various stations of the Iwahig Penal Colony:

In accordance with instructions received in Memorandum Order Number 2,070, the following statement is respectfully submitted:

On October 5, 1910, a thorough inspection was made of the coconut grove at Binuan, situated on a stretch of black sand adjoining the Bay, and only a couple of feet above its level. The seven hundred trees comprising the plantation were set out during the rainy seasons of the years 1907, 1908, and 1909. Rapidity of growth, vigorous health, and freedom from insect attacks is noticeable in this plantation.

The trees planted in 1907 are about twenty-four feet high, six and three-quarters feet in circumference, and have an average of twenty leaves each, springing from the ground up. *One of those trees is now bearing fruit.*

Those planted in 1908 are on an average fifteen feet in height, three and one-half feet in circumference, and bear about ten leaves each.

The one-year-old plants are six feet high and bear about seven leaves each, and are about eighteen inches in circumference at the ground.

A few of the trees are planted in the hummocky crab ground formerly the home of the mangrove. *These although making fair growth, are not as vigorous as those along the sandy beach.*

On the same date the plantation situated on the Tagculasi promontory was inspected. The five hundred and twenty-two trees here vary in age from *two to six years.* They are entirely free from insect attacks and the same vigorous healthy growth was observed here as in Binuan.

The soil is mostly of a coral formation, but in some places is gravelly, and in other situations of a loamy character.

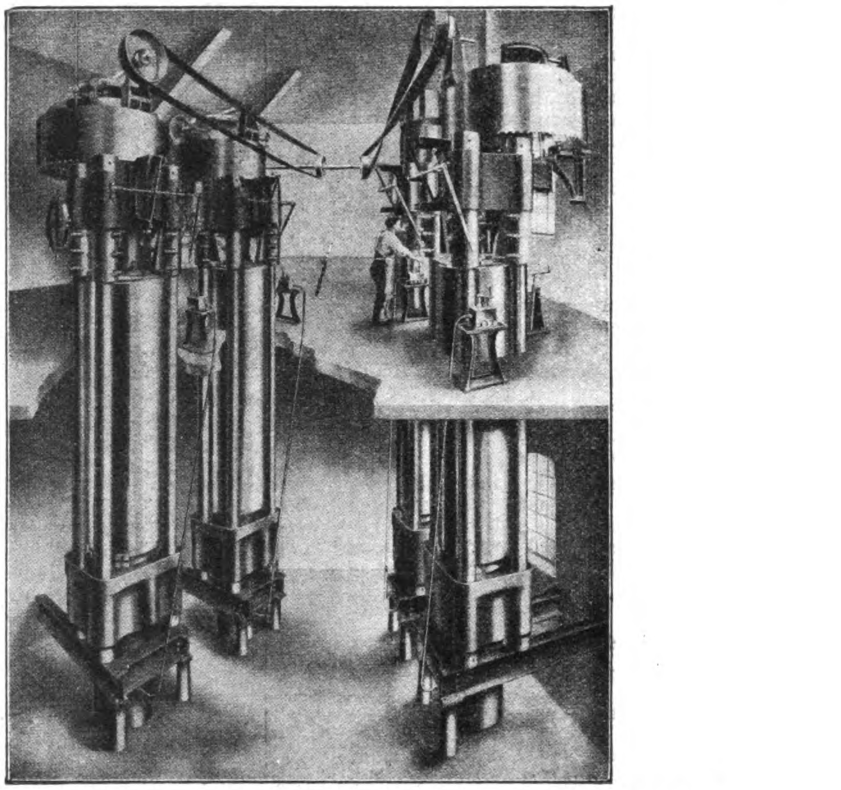
Notwithstanding this, there is not much difference in the growth of the trees, *if we except a few growing on the coral soil near the shore, which seem to have made more headway than the others.*

The other trees which were planted thirty feet apart, *bear from 60 to 120 nuts*, but those planted only eighteen feet apart bear fewer nuts and are characterized by long stems.

On October sixth, the plantations of Kabulbug and Santa Tereza were inspected. The older trees were planted in 1907.

They are entirely free from insects, and although making excellent growth, they are not flourishing as well as those at Binuan, *probably on account of being more inland.*

The circumference of the stems of the 3½-year-old trees is about four and one-half feet; height about 15 feet, and they bear about 15 leaves each.



"PREMIER" HYDRAULIC OIL PRESS, FOR COPRA AND OTHER PRODUCTS
(Rose, Downs & Thompson, Ltd., Manufacturers)

NUMBER OF NUTS PER TREE PER YEAR.

According to a Bureau of Agriculture bulletin, an acre of properly planted coconuts should produce about 2,000 nuts per year, or 50 nuts per tree. The same authority states that trees which by actual count average 50 nuts per tree per year abound; that at Sarabaya trees average 60 nuts per tree per year over hundreds of acres, and that this condition will be found to prevail in Pangasinan, La Laguna, Cebu, Panay, Mindanao, and wherever trees are grown on a generous scale. It is further stated that there are recorded perfectly authentic reports of as many as 128 nuts being taken from a single tree in a year.

One tree at Zamboanga, the owner claims, never produced less than 200 nuts annually, during a period of 23 years. This man claimed that his trees averaged him 100 nuts per year, sometimes falling to 60 and again running as high as 130.

Lieutenant Manuel Fortisch, Philippine Constabulary, reports that at Ginoog, in Misamis, coconuts do particularly well and that a planter there claims 120 nuts per tree per year from old, well-established trees.

Sr. Vicente Diaz states that mature, bearing coconut trees will produce from 60 to 120 nuts per year, with an average of 80.

Mr. P. J. Moore, who is very familiar with conditions in the Moro Province, states that the actual average annual number of nuts per tree in the District of Zamboanga is approximately 45. This includes large numbers of trees which produce no nuts at all on account of being planted too close together. It would, therefore, seem that an estimate of 60 nuts per tree per year for a grove in which the trees were set at proper distances and properly cultivated would be conservative.

HARVESTING NUTS.

Nuts when ripe should be carefully harvested. It is best to cut the stems close to the nuts with a sharp knife or a pair of pruning shears. If nuts are not wanted for seed, they may be allowed to fall to the ground, but if intended for planting they must be carefully lowered as otherwise many of them will be so injured by the fall that they will fail to germinate. Nuts should be harvested every three months and at this time dead leaves and the surplus clothlike bark which grows about the bases of the leaves should be removed. If it is found that beetles are boring into the trees to any extent, clean, "sharp" sand should be freely scattered in the axillae of the leaves and if any of the large holes made by rhinoceros beetles are found, they should be probed with a hooked wire, the beetles removed and the holes then plunged with wood to prevent them from holding moisture and causing decay.

METHODS AND COST OF COPRA MAKING.

In the majority of cases the method at present employed in making copra is as follows: The nuts are husked by the use of a sort of metal spear point fixed to a stick set vertically in the ground. The shells are then cracked in halves with well-directed bolo (working knife) strokes and are placed in the sun, concave side up. A less common though perhaps more advantageous proceeding is to halve the unhusked nuts with a bolo.

As the meats begin to dry they shrink away from the shell and are then readily removed. They may be dried in the sun until all but about 10 per cent of the moisture has been driven off. If weather conditions are favourable, sun-dried copra is very white and brings a high price, but as coconuts thrive best in regions where the rainfall is quite evenly distributed throughout the year, copra is liable to get wet from time to time when drying and this darkens it.

Unfortunately, in many districts, the Filipinos do not care to take the trouble to sun-dry their copra but place it in bamboo racks under which they build fires. Copra cured in this way is not likely to be anything like so uniformly or so thoroughly dried as that cured in the sun. The smoke turns it dark and the oil obtained from it contains a certain amount of creosote. Any person producing copra on a large scale should install an artificial drying plant.

The system employed for drying codfish at Gloucester, Massachusetts, might well be utilized. A good sized heater causes hot water to circulate through a system of pipes on which are placed "flakes" consisting of rectangular wooden frames over which ordinary poultry wire is spread. These "flakes" are about 10 feet by 6 feet and are slid in place from both sides of the system of hot water pipes, the whole system being some 20 feet wide. The hot water pipes are contained in a closed

chamber in which a number of doors are suitably located. Into this chamber air is forced by a large rotary ventilating fan and the opening or closing of doors causes it to circulate as desired. Copra dried in this way would be snow white, and would bring a peso or two a picul above the regular market price.

The expense involved would be small as dried coconuts husks make excellent fuel, and the ashes from the furnace would make good fertilizer for the growing trees.

Accurate data as to the cost of harvesting nuts and making copra are not available.

It is stated that the average operator will husk a thousand nuts per day and that one man has been known to husk as many as 3,000. The work is hard, however, and $0.50 per day should, therefore, be allowed as the wage for coconut huskers. A second man should be able to halve and a third to put in the sun the nuts which the first man husks.

I understand that a number of copra making plants in India and Ceylon are now supplied with decorticating, breaking and drying appliances, which make the cost of producing copra materially less than that involved in the use of hand-labour.

ENEMIES OF COCONUTS AND MEANS OF COMBATING THEM.

In the Philippines coconut trees are comparatively free from enemies. In some of the sugar-growing regions the rhinoceros beetle, which breeds in the bagass heaps, sometimes causes considerable losses by boring into the trees, especially if the number of coconut trees is small so that large numbers of beetles concentrate their attacks on individual trees. Other species of bettles, which attack the wood of the trees, have been found, but as a rule their depredations are not at all serious. Insects may best be attacked by destroying their breeding places. The spreading of "sharp," coarse, clean sand in the axillae of the young leaves which are favourite points of attack, is said to be useful. Probing with a stout, hooked wire may be effective in the case of the rhinoceros beetle.

After all is said and done, clean cultivation is the great remedy for insect pests which are not at all likely to cause serious damage on well-kept plantations.

On the mainland of the larger Islands monkeys, crows and fruit bats cause a certain amount of damage by destroying young nuts. Judicious use of a shotgun will reduce to an unimportant minimum the losses from such sources.

Wild hogs are the coconut planter's most serious enemy. On the islands where they abound nothing will suffice but careful fencing until the trees are at least two years old, after which time they are not liable to injury by hogs.

Bud-rot, which causes heavy loses in some coconut-growing countries, is almost unknown in the Philippines. So far as I am aware, it has developed in only one small area in Laguna province. Here it was vigorously attacked and promptly stamped out.

PROFITS.

With reference to this subject Supt. C. H. Lamb, of the Iwahig Penal Colony, makes the following statement:

The conclusion reached, from the writer's experience, is that coconut planting for a permanent crop and investment, cannot be equaled by any other known permanent crop, not even rubber. It is superior to rubber in the Island of Palawan. The usual argument advanced to the contrary, places great value upon the fact that Palawan does not have typhoons which would damage the rubber crop—the same fact is of almost equal value to the coconut. The thing which caused the writer to begin the coconut industry before he had data available which would show the cost of planting, was the short time in which the trees reach maturity and begin to bear.

Sr. Vicente Diaz states that 240 nuts, more or less, will make a picul (137½ lbs.) of copra.

Sr. Palanca of Binuan, Busuanga, gets a picul of copra from 160 to 180 nuts.

Mr. P. J. Moore states that in the District of Zamboanga 180 to 220 nuts make a picul of copra.

The Bureau of Agriculture Bulletin estimates 2,000 nuts per acre. They should produce copra to the value of at least $50.00.

Mr. J. H. Shipley of the Mindanao Estates Company plantation states that at Davao the average value of the crop of a coconut tree is $1.00 per year. This would give gross returns of $40 per acre.

One picul of copra from 200 nuts should be a conservative average on a well-kept plantation and allowing 60 nuts to the tree and 40 trees to the acre, this would give 12 piculs per year, which at $5,00 per picul would give gross returns of $60.00 per acre per year from which must be deducted the annual cost of cultivating between the trees, say $5,00 per acre, and the small cost of harvesting the nuts and making the copra. As coconut trees attain great age and have been known to produce when a hundred or more years old, it is evident that a plantation, once well established, should give steady and large profits for a long period of years.

Hon. Manuel Quezon, a native of the Province of Tayabas, who is thoroughly familiar with the coconut industry there, states that the maximum annual *profit* from a bearing coconut tree is $1.50 and the minimum annual *profit* is $1. This estimate is for fire-dried and smoked copra, which is an inferior article, and is based on giving one-half of the copra from each tree to the man in charge. One individual can care for 1,000 trees, and in order to get his half of the copra he must do this throughout the year, cleaning the brush from the ground, removing dead leaves, etc., harvesting the nuts every three months, and drying the copra.

During the past year the best sun-dried copra has brought as high as $6.00, and even $7.00 per picul, and the price of copra has held very steady for years, with a slight tendency upward.

ESTIMATED COST OF ESTABLISHING A 2,500 ACRE COCONUT PLANTATION ON RENTED PUBLIC LAND.

The following is a statement of the approximate cost of establishing a 2500-acre coconut plantation and of the revenues which should be derived therefrom at practically the existing market price of copra. It should be remembered, however, that properly dried copra will unquestionably bring a price materially in advance of that commanded by the smoked and imperfectly dried article which at present makes up the bulk of the Philippine product.

This estimate is based on clearing half of the land the first year and half the second year. 200 acres of land are reserved for buildings and other purposes. A more liberal allowance is made for the cost of clearing the land and preparing it for planting than is called for by the estimates hereinbefore quoted and as the returns from catch crops will manifestly depend directly on the character of the soil selected and on the efficiency of the administration of the estate, no allowance is made for them.

Practical experience has shown that under capable administration, with favourable soil and market conditions, they may be made to pay the cost of clearing and planting the land and that of keeping it clean during the first two or three years after it is cleared. I am of the opinion that if this is done it is all that can be expected and I doubt somewhat whether it would be feasible to achieve this result on a coral island. Nevertheless, if I myself were selecting a site for a coconut plantation, I should select one on a coral island which was pretty well isolated in order to avoid possible danger of insect and other pests which might result from the fact that neighbouring plantations, if any existed, were badly cared for.

FIRST YEAR.

	On Ordinary Forest Land	*On a Coral Island*
Survey	$ 250.00	$ 75.00
Rental	256.00	256.00
Clearing and plowing 1250 acres at $20 per acre	25,000.00	....
Clearing 1,250 acres at $10 per acre (plowing not necessary)	....	12,500.00
Cost of seed	1,656.25	1,656.25
Planting 33,000 nuts, at $.02½ each	825.00	825.00
Fencing	1,000.00	....
Asisstant manager's salary	1,800.00	1,800.00
Assistant manager's house	1,000.00	1,000.00
Labourer's quarters	2 000.00	2,000.00
Storehouse for rice, tools, trade-goods, etc.	500.00	500.00
Well, tank, pumping engine and pipe for water supply	600.00	600.00
1 mile of track (rail, 12 lbs. to yd.)	765.00	765.00
5 cars at $30 each	150.00	150.00
Tools	500.00	500.00
15 draft cattle, at $40 per head	600.00	600.00
One American or Australian horse	150.00	150.00
Two native ponies, at $50 each	100.00	100.00
One 30-foot launch, with 10 h. p. petroleum engine	1,500.00	1,500.00
Launch engineer at $37.50 per month	450.00	450.00
Kerosene, engine oil, cotton waste, for launch	200.00	200.00
Totals	$39,302.25	$25,627.25

Note: A launch is estimated for because unless the plantation is located directly on some inter-island harbour one will be necessary in keeping up communication between the plantation and the nearest port. A liberal estimate has been made for quarters for men, which would allow of putting up a substantial shed, with galvanized iron roof. It would give the men good quarters and could later, at small additional expense, be converted into a drying shed, while the iron roof would be useful for catching rain water, especially on coral islands. A good well, with a pump, tank and pipe is essential in order to provide adequate bathing facilities for the assistant manager and men, and water for animals, sprouting nuts, etc.

It would probably be necessary to run a small store in connection with a plantation at which articles of common necessity should be sold at Manila prices, plus 20 per cent, plus cost of transportation, but labour should be paid for in cash and the men left free to trade at the store or not, as they please.

From the total should be deducted the receipts from catch crops, if any, and from the sale of timber and firewood, which on forest land might somewhere nearly cover the cost of clearing and planting. The sandy soil of coral islands will grow pineapples, peanuts, cassava, corn, or yams, but as weeds do not spring up readily on this soil and as comparatively little work is required to keep it clean, it might be more desirable not to plant catch crops but to leave all plant food in the soil for the coconut trees.

It will be noted that I have provided for an assistant manager only. It would be necessary to have one competent man constantly on the ground. There would be necessity for work in other places in connection with the purchase and shipment of supplies, seed nuts, etc., and the securing of labourers, which should be performed by a manager, and the best way to provide for this unless the owner himself cared to do it would be to have one thoroughly competent man who would serve as general manager for several plantations and who would not only perform the work above referred to but would visit and inspect the plantations at frequent intervals.

If the assistant manager proves capable, his salary should be raised $200.00 per year until it reaches at least $3,000.00.

SECOND YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Clearing and plowing 1250 acres at $20 per acre	25,000.	....
Clearing 1250 acres at $10 per acre (plowing not necessary)	....	12,500.
Cleaning 1250 acres of land already planted at $10 per acre	12,500.	....
Cleaning 1250 acres of land already planted at $5 per acre	....	6,250.
Planting 33.000 nuts at $.02½ each	825.	825.
Fencing	1,000.	....
40 labourers' houses at $25 each	1,000.	1,000.
Assistant manager's salary	2,000.	2,000.
Tools	400.	400.
5 draft cattle at $40 per head	200.	200
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and water system (10 per cent)	451.50	451.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$44,582.50	$24,832.50

NOTE.—From the totals above given should be deducted the receipts from the sale of catch crops and from the sale of timber and firewood, if any.

THIRD YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres of land at $5 per acre	12,500.	....
Cleaning 2500 acres of land at $2.50 per acre	....	6,250.
Assistant Manager's salary	2,200.	2,200.
Tools	250.	250.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and water system	451.50	451.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$16,807.50	$10,557.50

NOTE.—From the total should be deducted the value of catch crops, which on forest land should be sufficient to pay the cost of keeping the land clean.

FOURTH YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres at $5 per acre	12,500.	....
Cleaning 2500 acres at $2.50 per acre	....	6,250.
Assistant manager's salary	2,400.	2,400.
Tools	200.	200.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and water system (10 per cent)	451.50	451.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$16,957.50	$10,707.50

NOTE.—From this year on there will be no catch crops of importance.

FIFTH YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres at $5 per acre	12,500.	....
Cleaning 2500 acres at $2.50 per acre	....	6,250.
Assistant manager's salary	2,600.	2,600.
Tools	200.	200.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
4 miles of track	3,100.	3,100.
½ mile of portable track	1,380.	1,380.
10 cars at $30 each	300.	300.
Depreciation on buildings, 1 mile of track, and water system (10 per cent)	451.50	451.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$21,937.50	$15,687.50

NOTE.—On favourable land some nuts will be harvested during the fifth year.

SIXTH YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres at $5 per acre	12,500.	....
Cleaning 2500 acres at $2.50 per acre	....	6,250.
Assistant manager's salary	2,800.	2,800.
Tools	200.	200.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and Water system (10 per cent)	929.50	929.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$17,835.50	$11,585.50

NOTE.—The sixth year a half crop of 30 nuts per tree may be estimated. While all the land in the plantation will need to be cleared in the first instance and kept clean thereafter, it will be safe to allow 200 acres for waste land and for that used for buildings, etc., so the crop of nuts for the sixth year from 1,150 acres may be estimated at 1,380,000, which should give 6,900 piculs of copra, worth $34,500, less cost of harvesting nuts and making copra.

SEVENTH YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres at $5 per acre	12,500.	....
Cleaning 2500 acres at $2.50 per acre	....	6 250.
Assistant manager's salary	3,000.	3,000.
Tools	200.	200.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and water system (10 per cent)	929.50	929.50
Depreciation on launch (20 percent)	300.	300.
Totals	$18,035.50	$11,785.50

NOTE.—This year a full crop of 2,750,000 nuts may be estimated for 1,150 acres and a half crop of 1,380,000 nuts from the remaining 1,150 acres under cultivation, or 4,140,000 nuts in all, from which 20,700 piculs of copra should be obtained, worth $103,500.

EIGHTH YEAR.

	On Ordinary Forest Land.	On a Coral Island.
Rental	$ 256.	$ 256.
Cleaning 2500 acres at $5 per acre	12,500.	....
Cleaning 2500 acres at $2.50 per acre	....	6,250.
Assistant manager's salary	3,000.	3,000.
Tools	200.	200.
5 draft cattle at $40 per head	200.	200.
Launch engineer at $37.50 per month	450.	450.
Kerosene, engine oil, cotton waste, for launch	200.	200.
Depreciation on buildings, track and water system (10 per cent)	929.50	929.50
Depreciation on launch (20 per cent)	300.	300.
Totals	$18,035.50	$11,785.50

NOTE.—During this year and thereafter a full crop of nuts should be harvested from the entire 2,300 acres, amounting to 5,520,000 nuts, equivalent to 27,600 piculs of copra, worth $138,000.

CONCLUSION.

It will be noted that the foregoing estimate is based on clearing half of the ground the first year and half the second. If labourers and funds are available it would obviously be more advantageous to clear the entire tract the first year as the period when the first full crop could be anticipated would thus be advanced by one year. On the other hand, if sufficient capital is not available at the outset to clear so large a tract as the one indicated a smaller tract of any desired size may be cleared. As the charge for rental of the land is small, there is no considerable pecuniary loss involved in clearing the land quite slowly.

That the above estimate as to the returns which may be anticipated is conservative is shown by the statement of Hon. Manuel Quezon as to the actual returns obtained in the province of Tayabas under existing unsatisfactory conditions as to planting and care of trees. Under the arrangement in vogue there, and previously mentioned, one man may care for as many as a thousand trees. He receives half of the price of the copra in return for giving the ground such cleaning as it receives, looking after the trees, harvesting the nuts, and making the copra. The *net profit* to the owner under this arrangement is from $1 to $1.50 per tree, an average of $1.25. On this basis 92,000 trees would give an annual net profit of from $92,000 to $138,000, or an average net profit of $115,000, and it would indeed be remarkable if trees properly set out and cared for in a region well to the south of Tayabas and not subject to the violent wind storms which not infrequently sweep across that province, did not do better than this.

It will also be noted that I have not allowed for any returns except from copra. It goes without saying that it would be advantageous to install a coconut oil mill as soon as the output of nuts in any given region was sufficient to justify it. What appears to be a reasonably conservative estimate of the profits from a coconut oil plant with a capacity of 1,000 piculs a day, running at its full capacity 300 days in the year, shows them to be approximately 120,000 dollars per year. It would take the copra from eleven 2500-acre plantations to keep such a mill running, but the estimate above referred to is based on the purchase of copra in the open market and whatever copra was required in excess of that produced on the plantation or plantations of those interested in the mill could be obtained in this way. In fact a mill might at any time be established at Manila or some other port of entry and be operated at a profit prior to the time when the plantations became productive, so that advantage could be taken of its facilities from the moment nuts were produced.

Actual experience has shown that there is a material loss of the oil in copra during its shipment from the Philippine Islands to the United States or to European ports, this loss being due in large measure to the fact that the mould which grows on copra thus shipped decomposes the oil.

A food product resembling butter, and used as a substitute for it, is now manufactured in large quantities from coconut oil. An important source of increased revenues might unquestionably be found in the manufacture of this product, and of soap, candles, and shredded coconut.

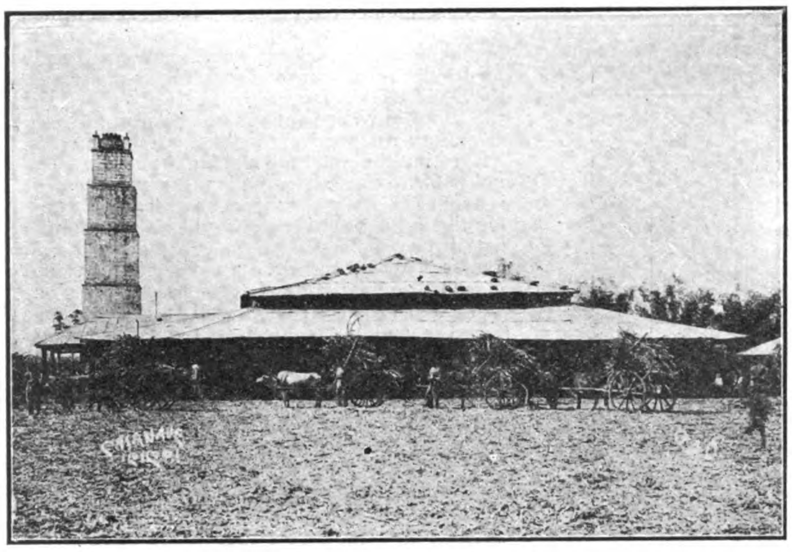
Both coconut oil and all other coconut products from the Philippine Islands are, under existing tariff regulations, admitted to the United States free of charge, which would place a factory manufacturing them at a decided advantage over similar factories in other countries so far as concerns the United States market, which is very important.

Figures as to the cost of a coconut oil plant of the capacity above mentioned and as to the profits which may be anticipated therefrom, will be furnished upon application.

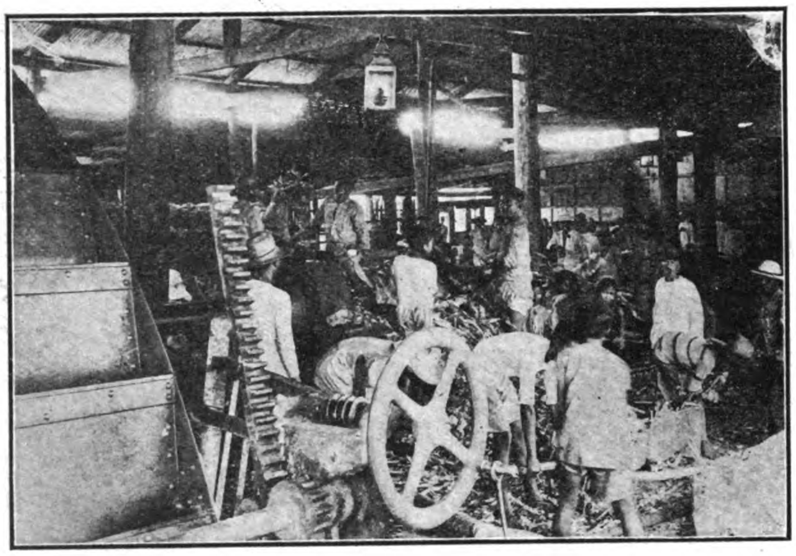
DEAN C. WORCESTER.

A NEW SUGAR FACTORY IN NEGROS.

It has taken many years for the native Filipino planter to overcome his prejudice against the use of modern sugar machinery but there are many signs that he is at last awakening from his long sleep, and is in a receptive mood to improve on the old primitive and wasteful concrete muck factories, which by courtesy have been termed sugar mills. As long as the Insular and near by China market would consume the low grade caramelized output of these mills, at a price which left a good profit to the planter, there was little incentive for him to better his plant, to manufacture a product suitable for foreign refiners. Time and again had some enterprising machinery agent persuaded the ignorant planter that what he needed was a new and larger mill, centrifugals, evaporators, vacuum pan, filter press, &c., to increase his profit, and as the machinery was sold and installed without any co-relation to the rest of the plant, it failed to work in harmony, with the result that it had to be



HACIENDA "FE" AT LA CARLOTA, NEGROS, P.I.



THE MILL AT HACIENDA "ZABORDA," ISLAND OF NEGROS

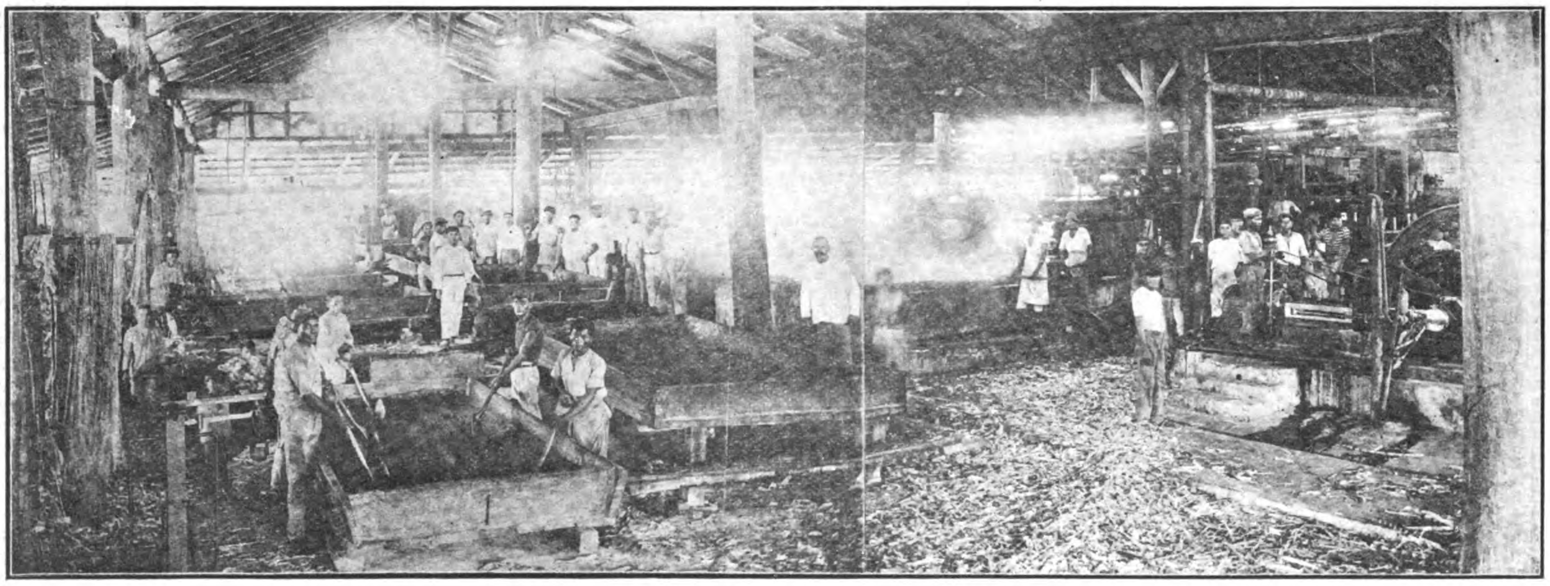
abandoned as unprofitable and the old methods resumed.

As a result of American occupation, and the effects of the Payne Bill, giving free entrance to American markets of 300,000 tons of Philippine sugars, the sugar industry has taken on a new lease of life, and several central factories propositions have been floated, and a few of the more enlightened and prosperous planters ars improving their existing plants, by the addition of such machinery required in the evolution of a concrete mill into one for the manufacture of centrifugel sugar. The writer is a firm advocate of the large central factory system as best adapted to the expansion of the sugar industry in the Philippines. Owing to the fact that there is little or no native capital to enlarge the existing mills, and also that the estates are too small in area to warrant the installation of a large plant to handle its crop, the large central factory, with a capacity of at least 1,000 tons of cane per day, is undoubtedly the wisest and most economical plan to adopt in the development of the industry.

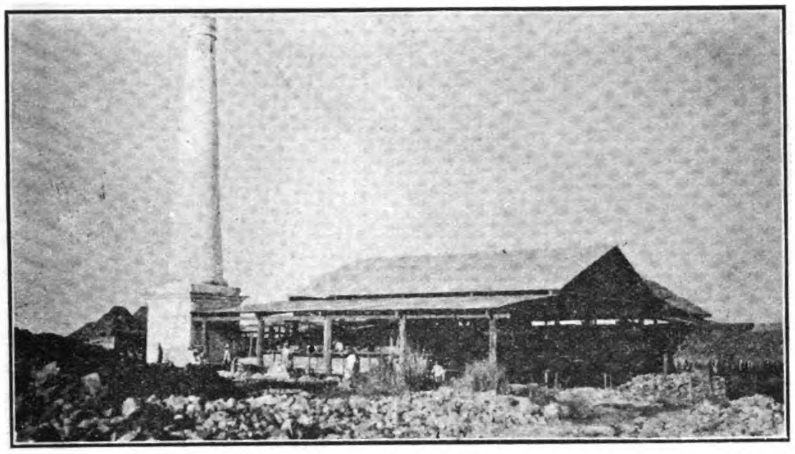
But at the same time, there are certain advantages in being able to own and operate a plant to handle the crop from any individual estate, and if the owner has sufficient capital or credit, and his acreage will insure him a supply of cane sufficient to operate economically a modern plant, its installation is fully justified at the present time. Experience in Cuba and elsewhere has proved however, that the establishment of the 2,000 ton central factories, in any given district has resulted in the closing down of all the smaller mills for miles around, and the demand for cane to keep the huge plants working to full capacity, necessitates the purchase of cane from independent farmers many miles distant. But the Philippines have still many years to go, before the industry arrives at that stage, and following the precedent of Cuba, the planter who has now the business foresight to be the first to enlarge his plant, and install complete modern apparatus, if only for a small capacity, will gradually be compelled to increase his plant, to grind the cane of his less fortunate neighbor, and thus develop into a full fledged central factory in due course of time.

TYPICAL NEGROS SUGAR CANE CONTAINING OVER 16 PER CENT OF SUCROSE

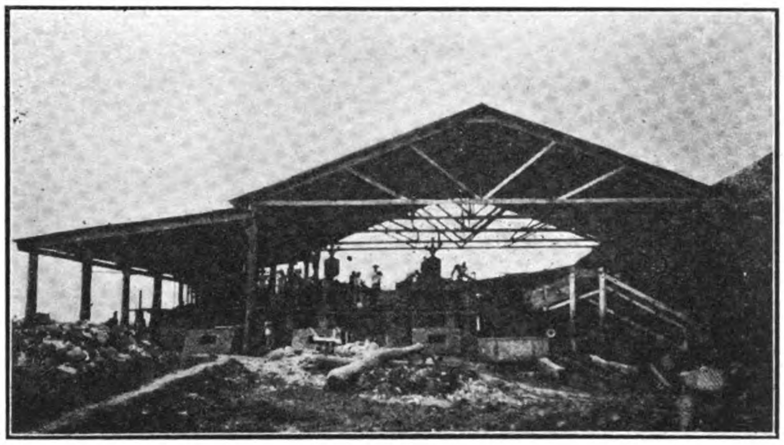
While large central factories operated by foreign capital may not materialize in the Philippines, as fast as expected the smaller plant under native control, will gradually develop in size and be compelled to assume the functions of the central factory. So it is a good sign for the future of the industry, and the prosperity of the Islands, that a few of the native planters have already set the example and enlarged their old outfits into small centrifugal plants capable of turning out a 96 degree product. One of the first to throw aside the traditional conservatism of the Filipino planter and demonstrate a faith in modern methods, were Messrs. Urguijo, Zuloaga & Escobi, proprietors of the San Antonio estate, located in the La Carlota district of Western Negros. With an estate of only 1,165 acres lying at the foot of the



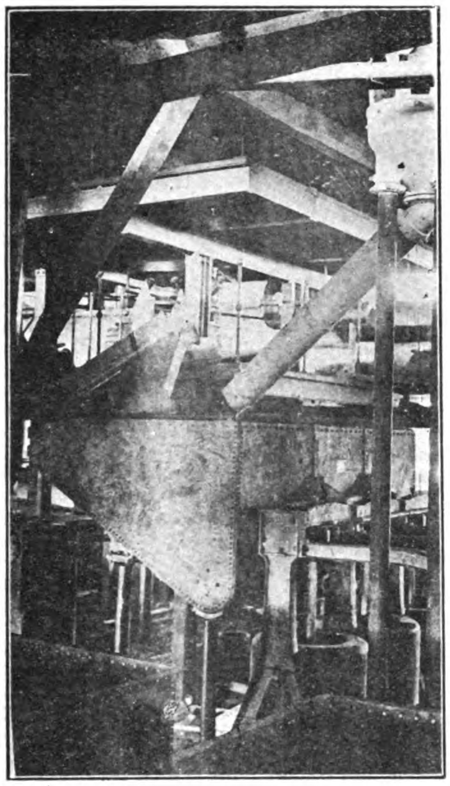
A TYPICAL OLD STYLE SUGAR HOUSE IN THE ISLAND OF NEGROS, P.I. HACIENDA "REFUGIO," SAN CARLOS, NEGROS



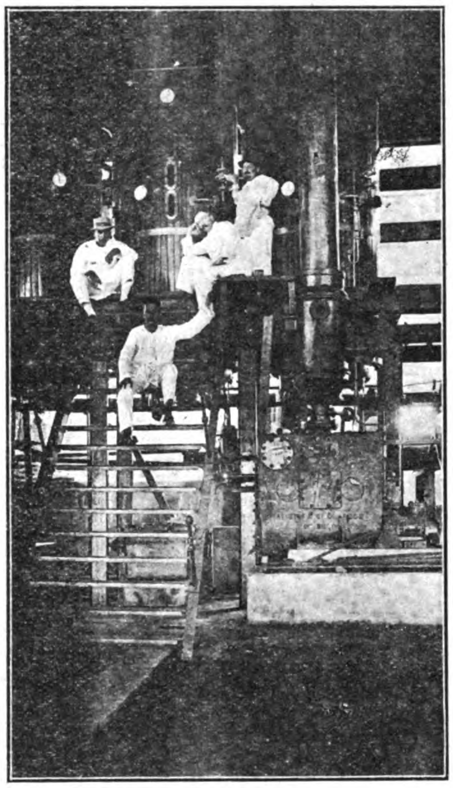
BOILER HOUSE, BEHIND FACTORY



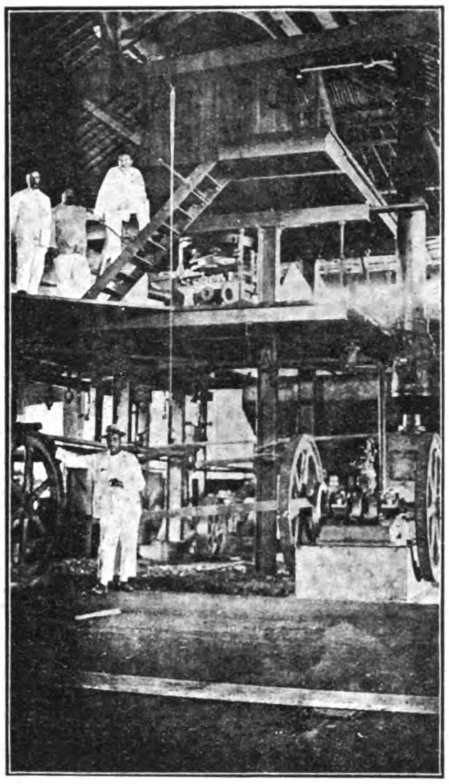
BOILER HOUSE, SHOWING BAGASSE CARRIER AND FURNACES



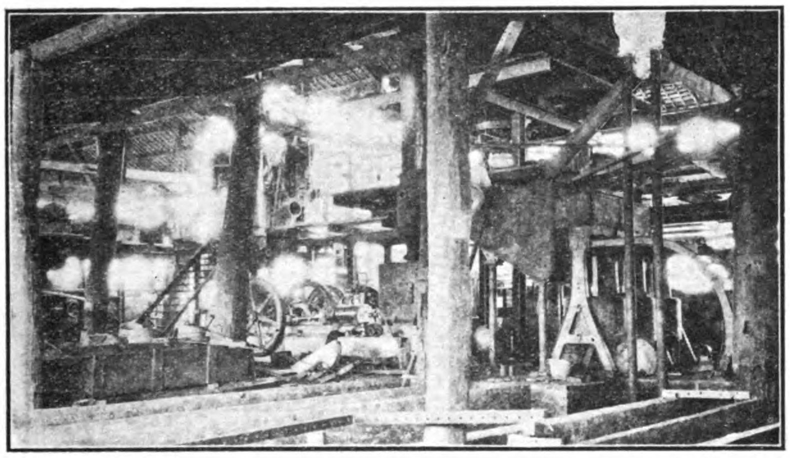
CENTRIFUGALS, MIXER AND SECOND SUGAR TANK



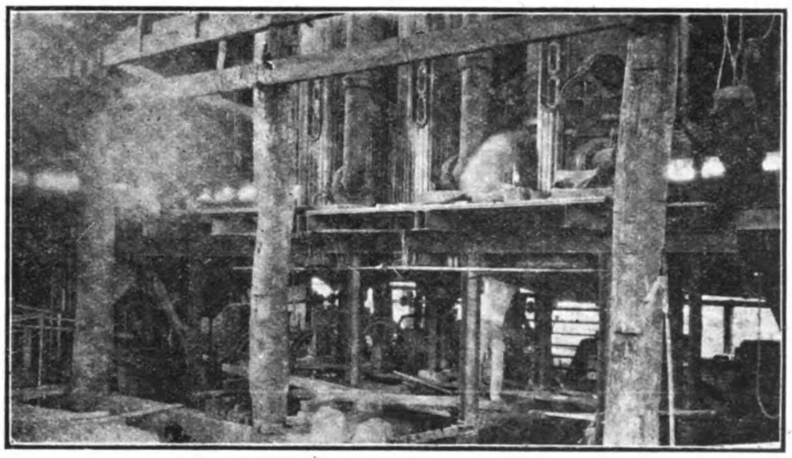
TRIPLE EFFECT AND VACUUM PUMP



VACUUM PAN AND PUMP



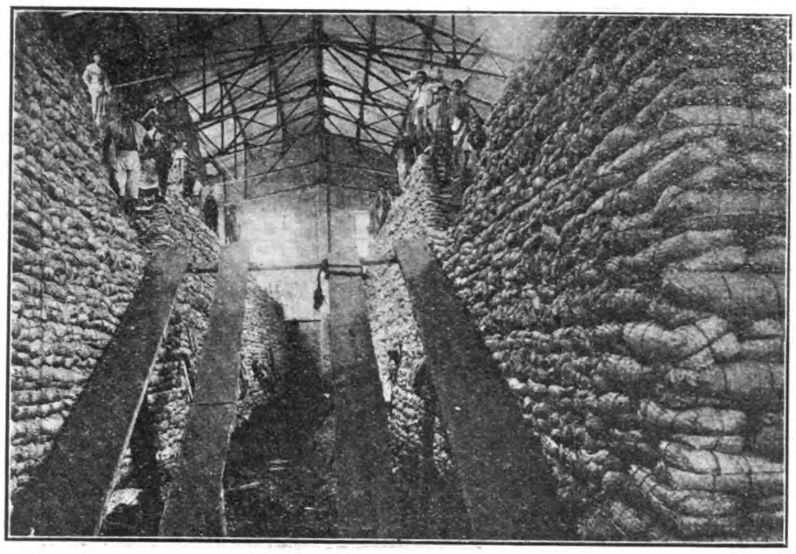
GENERAL VIEW OF INTERIOR, DURING ERECTION



TRIPLE EFFECT AND VACUUM PUMP, DURING ERECTION

THE FIRST MODERN SUGAR FACTORY IN THE PHILIPPINES

The New 150 ton Sugar Factory, Erected on the "San Antonio" Estate in Negros, P.I. By Messrs. Strachan & McMurray of Iloilo, Representing, Aitkin & Co., of Glasgow



NEGROS SUGARS IN THE ILOILO WAREHOUSES

mountains, 15 kilometers distant from the coast, these gentlemen last year ordered a complete plant with a capacity of 150 tons of cane in 24 hours, from Messrs. Strachan & McMurray, the sugar engineering firm of Iloilo, representing Messrs. Aitken & Co., the well known Glasgow sugar machinery manufacturers. One of the conditions was that the plant should be ready for operation at the commencement of the 1912 grinding season, or eight months from the placing of the order. The difficulties of transport, loss of time due to the great strikes in England, the many set backs incidental to installation work in the tropics, and the lack of experienced mechanics familiar with modern sugar machinery, all tended to delay the execution of the contract, and that it was completed in time, is a tribute to the engineers and manufacturers. Those who have had experience in tropical sugar engineering and what it means to install a complete new plant of this size in time to prevent the loss of a crop, will render due credit to the efficient organization and management which made such a task possible.

The "San Antonio" called for the installation of two three roller mills, boilers, green bagasse burners, defecators, clarifiers filter presses, triple effect evaporating apparatus, vacuum pan, centrifugals, cooling tanks and cars, and the various conveyors, pumps, engines and other devices supplementing the main items. The mill is located at the lower end of the estate, and connected with the fields by a light railway. The loaded cars run down to the mill by gravity and the empties returned to the fields by oxen. From the cars the cane is delivered to the mill carrier by hand. The first mill is fitted with a "Diamond" top roller, acting as a crusher, and giving increased capacity for the second mill to crush and extract the juice. The "Diamond" crusher is a patent of Messrs. Aitkin & Co. of Glasgow, and consists of two rollers, both of which have a surface with diamond projections slightly elevated above the surface of the roller, and so arranged that they mesh into each other, crushing the cane, and opening all the cells, so that the rolls of the mill are enabled to extract a much larger percentage of the juice. As a modification of the usual practice of installing the two roller crusher before the first mill, Messrs. Aitkin & Co., have devised a diamond roll which is made to replace the top roller of the first mill unit of a six roller mill, so as to make the first set of rollers act as a crusher. This is the device employed at the San Antonio mill.

On emerging from the rolls of the first mill, the bagasse, is macerated with hot water, to the extent of 10 per cent, before passing on to the second mill. Green bagasse furnaces of the Dutch oven type, have been installed in connection with the multitubular boilers, and being the first burners ever seen in the Islands, came in for considerable "expert" criticism from the many native planters who witnessed their first performance. The green or wet bagasse, fed direct from the mill as fuel to the burners, was against all the previous experience, and prophecies of the planters that it could not be done, was an object lesson calculated to have beneficial results in the future.

The different processes which go to make up the manufacture of sugar from the juice, are similar as in other small modern plants. After leaving the mill tank the juice is pumped through a Juice Heater, to the defecators,

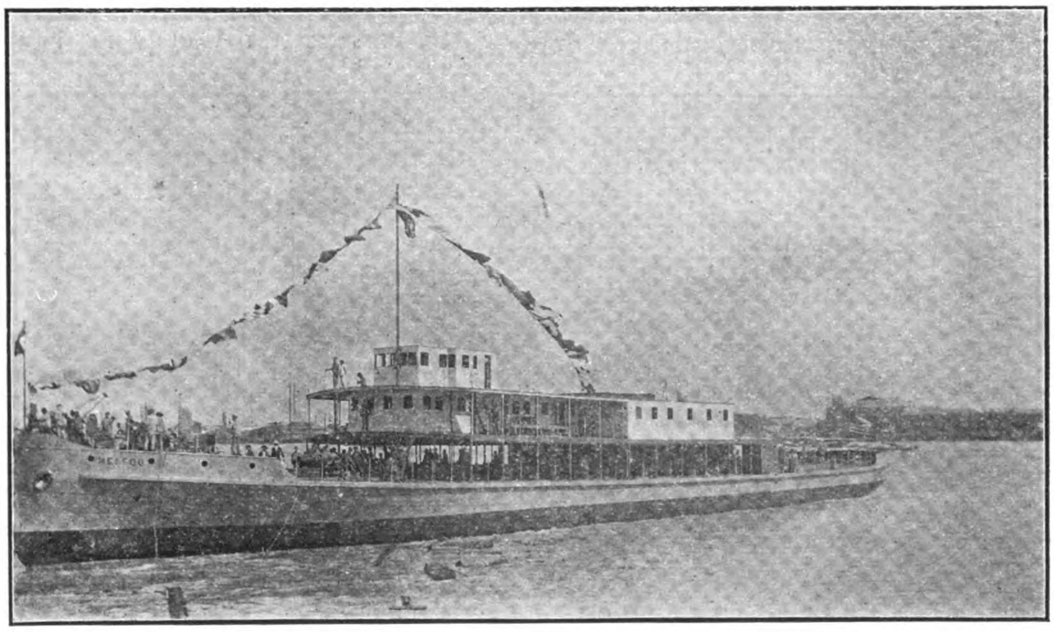
(Continued on page 98)

STANDARD OIL STEAMER

On June 18th, there was launched from the yard of the New Engineering and Shipbuilding Works, Ltd., at Yangtszepoo, the steel twin screw steamer Mei Foo, built for the Standard Oil Company for trade on the upper Yangtsze.

The Mei Foo is a light draft steamer, fitted to carry 500 tons of oil and 100 tons of bunkers on a 6 feet draft. Her dimensions, moulded, are 240, by 40, by 9 feet 3 inches, and she is built throughout of steel on the tunnel stern principle. Her two sets of triple expansion engines will be capable of developing 1,100 horse power and she will also be fitted with two marine boilers. For the handling of any special cargo from port to port there are a steam windlass, steam capstan, and a steam winch lifting five tons while steam steering gear is also equipped. A motor pinnace for the purpose of taking soundings in shallow waters has been provided and a spare oil engine will be carried for use while lying in port.

The accommodation is all placed on the upper decks in order to make the vessel a comfortable boat for the officers and crew. She is to run on the upper Yangtsze, Hankow, Poyang and Tungting lakes. The Captain's room and wheelhouse are situated on the boat deck. On the upper deck there is a large saloon and state rooms for two engineers and two deck officers. There are also two spare state rooms for any of the owners' staff who may travel with her, and accommodation on the upper deck is also provided for the compradore and Chinese officers. The crew have a spacious forecastle divided for sailors and firemen. She is fitted throughout with electric light. The bulk oil is carried in three tanks divided by a longitudinal bulkheads. The pump house is situated on the main deck and has a Worthington oil pump fitted with suction and delivery pipe capable of pumping out the oil in ten hours.

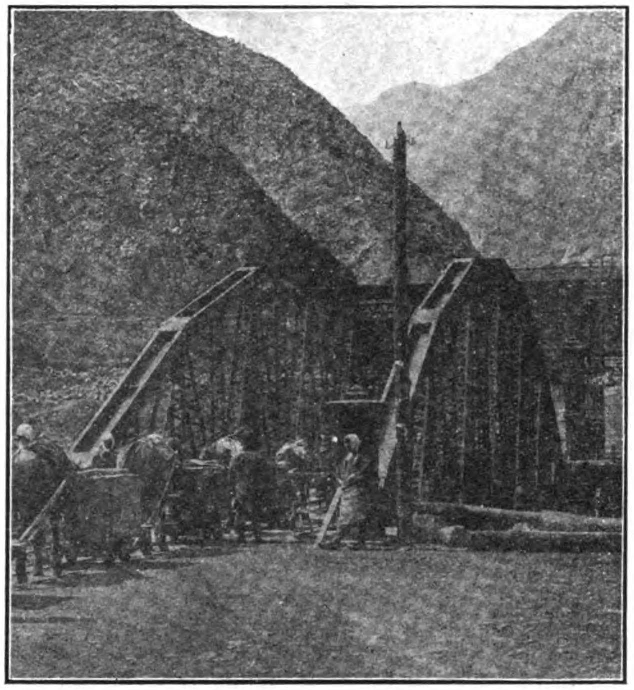


STANDARD OIL STEAMER "MEI-FOO," BUILT BY THE NEW ENGINEERING & SHIPBUILDING WORKS, SHANGHAI

THE MINES OF THE ORIENT

THE FURUKAWA MINING COMPANY

FURUKAWA MINING CO.: GENERAL VIEW OF MATU, ASHIO



BRIDGE AT ASHIO COPPER MINES

Wire Manufacturing. The electrolytic copper is melted by a reverberatory furnace, and then cast into wire bars. When the wire bars are properly heated, they are subjected to a rolling mill, where several kinds of wire rods are made. These wire rods are drawn into the wire of desired gauge.

There are eight continuous drawing machines and many single drawing blocks. Small wire is also drawn in this works. For annealing the finished wire we use here the Bates and Peard patent annealing furnace. The hard drawn wire, produced here possesses the following mechanical and electrical properties:

	Tensile strength	Conductivity.
Wire smaller than 150 mils in Diameter.	60,000 lbs. per sq. inch.	98 per cent (Matthiessen's standard.)
Wire larger than 150 mils in diameter.	50,000 lbs. per sq. inch.	(,,)

ANI COPPER MINES

(Annual production 1,400 tons of copper)

Location. The Ani Copper Mines are in the town of Ani, on the western part of the Mountain, Moriyoshi, in Akitaken.

The area of concession is more than 3,000 acres, and stretches over some 5 miles.

The mines consist of five mines, viz. Kosawa, Kayakusa, Magi, Sammai and Ichinomata, which have ten dressing plants and one reduction works.

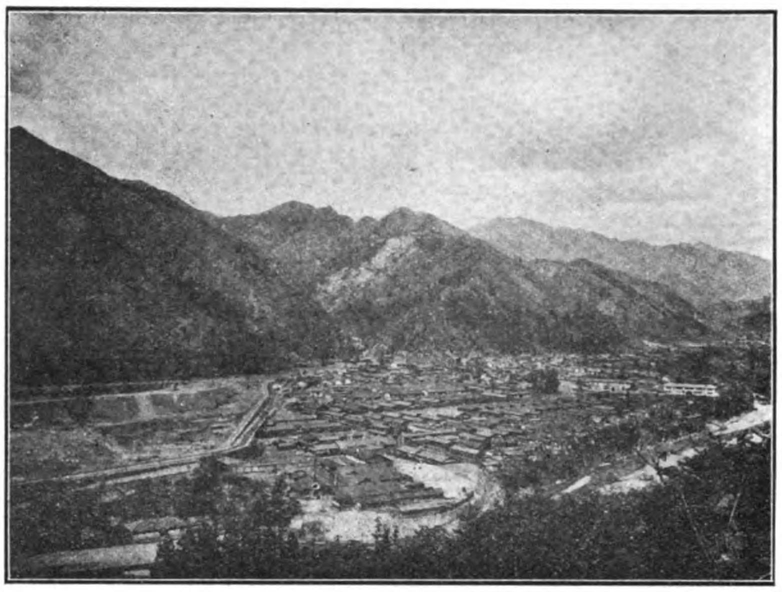
MINERS HAND DRILLING, ASHIO

History. The mine Kosawa was discovered in 1670 by a merchant of Ōsaka, and since that time the mines Kayakusa, Magi, Sammai and Ichinomata have been found. In 1702, the whole mines were worked by the Satakes the feudal lords. In 1871, they were transferred to the Imperial Government, and during about ten years they were worked in a large scale under the direction of European engineers. In 1885, they were purchased by the late I. Furukawa.

Geology and Ore Deposit. The geological formation of Ani Copper Mines is Tertiary sediments, liparite, and andesite. The Tertiary is chiefly an alternation of tuff and tuffaceous shale, and extends over a large area. Its general strike is N-S and the dip is 20°-30° to E or W. The liparite occurs as dyke or mass, and it appears as various facies. The andesite is found also as dyke and it is a kind of pyroxene andesite; sometimes it resembles a diabase.

The ore desposit in veins which traverse the whole formation. The strikes of the veins are of two kinds, the first is N 60° W or E-W, called the E W lode, and the second is N-S or N. 30° E, called the N S lode. The dip is usually steep but some of the N S lodes have a low dip, less than 40.° The E W lodes are cut by the N S lodes which are sometimes disrupted veins and occasionally clay veins. The E W lodes are abundant in number, though they are not wide and long generally; and the N S lodes are big but few in number.

GENERAL VIEW OF GINZANDAIRA, ASHIO



GENERAL VIEW OF TSUDO, ASHIO COPPER MINES

The E W lodes in the mines Kosawa, Magi and Sammai, and the N S lodes in Kayakusa Mine are usually worked.

The chief metallic minerals are chalcopyrite associated with pyrite. Sometimes, galena and zincblende occur as crystals on the chalcopyrite and pyrite. The vein stuff is quartz mainly, but sometimes calcite and baryte occur also. The oxidized zone extends deeply ; and there are bornite, chalcosite, malachite, chrysocolla, native copper, etc.

The main lodes are described as follows :

Kosawa Mine.

Maehi, Shimoyama-ōdate, No. 1-10 of Meisei, Chōsei-maehi, Chōsei, No. 8, Banza, Hibira - ōdate, Ōgihira - ōdate, Neumahi, etc.

Among them, the last three belong to N S lodes, and the others to E W lodes.

Magi Mine.

Nukanai-ōdate, Atago, Atago-ōdate, Yokohi, etc.

The first three belong to E W lodes, and the last to N S lodes.

Sammai Mine.

Irodate, Gonnosuke-okuhi, Kakuchi-yama-ōdate, Sanryō-ōdate, Chabakuhi, Neumahi, etc.

The last two only belong to N S lodes.

Kayakusa Mine.

Maehi, Shimotenguhira-ōdate, Shinsei Shinsei-uwabanhi, No. 2, No. 3, No. 4, Konsei, Kamitenguhira-ōdate, etc.

Nearly all the veins belong to N S lodes.

Ichinomata Mine.

Shōgorōhi, Yanagiwarahi, Katsuhira-ōdate, Sasukehi, Ishiganehi, Uwabanhi, etc.

Almost of them run with the strike N 50° E.

Mining

Levels and Shafts. There are a good number of levels and shafts, of which a few principal ones will be described as follows.

Kosawa Mine.

Manaita level :—The adit is situated on the bank of the Kayakusa River. The level is driven by crosscutting at first, and then having proceeded along Shimoyama-odate vein and Machi vein, it penetrates the vein of Meisei, and afterward proceeds along Hibira-odate vein. The level is 10 ft. wide, 7 ft. high and 8,000 ft. long, and double tracks are laid down. It is the most important level for transportation and drainage in Kosawa Mine. Below this level there are four levels at present.

Kambun level:—This is situated 130 ft. above the former level, and is driven in a similar way. It is 7 ft. high, 4 ft. wide and 4,500 ft. long. There are some ten levels above the Kambun level with an interval of 60—80 ft., of which the lower five levels are now in use.

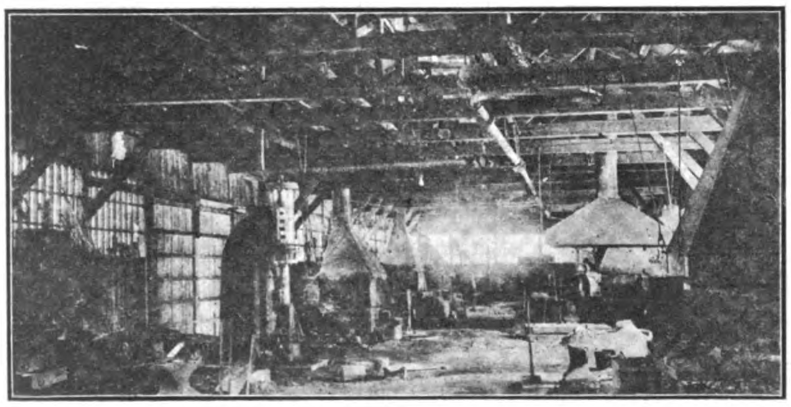
Kosawa main shaft:—The shaft (4 ft. × 14 ft.) is one of the blind shafts, which is sunk at Maehi vein in Manaita level, and it descends for 320 ft. now. Winding and pumping machines are equipped here in the shaft.

Kayakusa Mine.

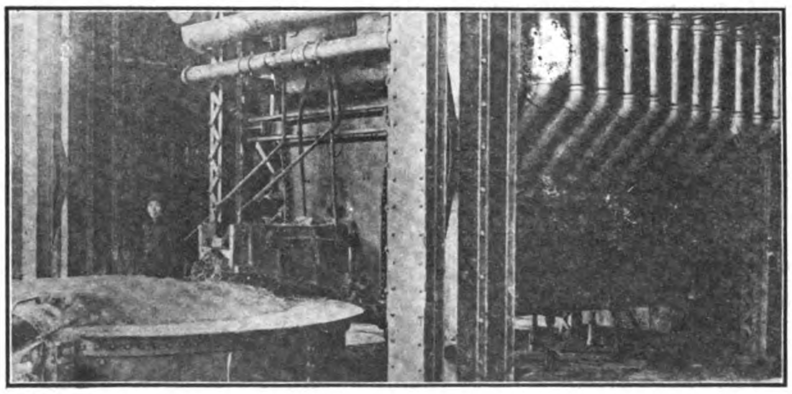
Chōmatsu level:—This is a crosscut which penetrates nearly all of chief veins in this mine. It is 7 ft. high, 10 ft. wide and about 1,000 ft. long, and the most important transportation level. There are seven levels above this level and six levels below.

Sosuidō level:—It is the third level below the former, and is 4 ft. wide, 6 ft. high, and 1,700 ft. long. It is used for drainage only.

Kayakusa main shaft:—The shaft (4 ft. × 14 ft.) is one of the blind shafts which is sunk at Shinsei vein in Chōmatsu level, and is 500 ft. deep at present. Winding and pumping machines are equipped here.



SMITH SHOP, ASHIO



BLAST FURNACE, ASHIO SMELTER

Magi Mine.

Koganehira levels:—It is the lowest level for the transportation and drainage, and is 7 ft. high, 4 ft. wide, and 1,500 ft. long.

Motosawa level:—It is situated at a height of 50 ft. above the former one, driven chiefly along Atago-ōdate vein, and is 6 ft. high, 4 ft. wide, and 8,000 ft. long. There are ten levels above Koganehira level, and they are connected with winzes.

Sammai Mine.

Amaike tunnel:—The tunnel is cut through at the foot of the mountain range between Kayakusa and Sammai valleys. It is only a road for purpose of transportation and communication. It is the lowest level in the mine and is 7 ft. high, 8 ft. wide and 9,000 ft. long, and double tracks are laid down all the way. During the driving of the tunnel, the chief veins in Kosawa and Sammai were found.

Nukibori (special working for the richer part of vein) and dressed ore contract.

Transportation underground. All levels are equipped with rails. Manaita adit, Chōmatsu level and Amaike tunnel are with a double track horse trolley. In the main shafts of Kosawa and Kayakusa, electric winding machines of 45 H.P. are equipped for the transportation from the lower levels.

Pumping and Drainage. In Kosawa, the water below the Manaita level is pumped up by the following electric pumps:

Knowles sinking pump	5 H.P.	1
Escher-Wyss turbine pump	100 H.P.	2
Knowles triplex sinking pump	20 H.P.	2

In Kayakusa, the water below the Suido level is pumped up by the following electric pumps:

Knowles sinking pump	25 H.P.	2
"	20 H.P.	1

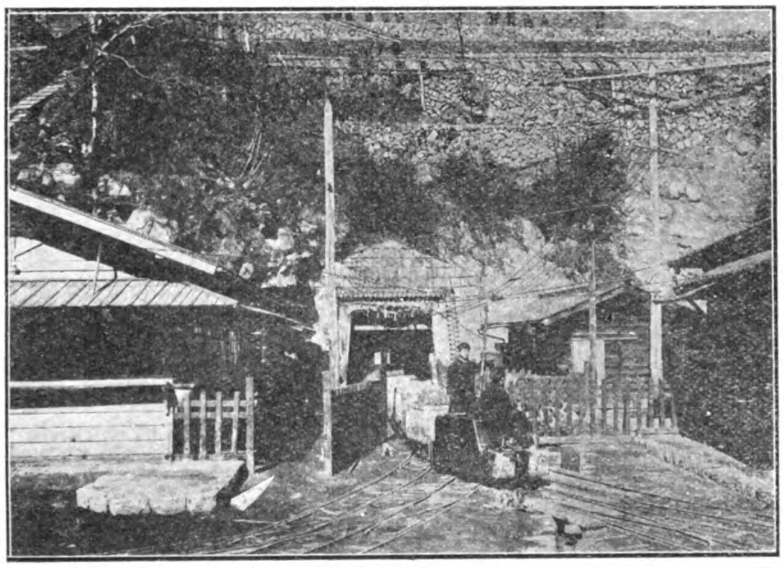
Dressing

Each mine has its dressing plants: Manaita dressing plant and Naka works, the other parts are thrown out into the dump.

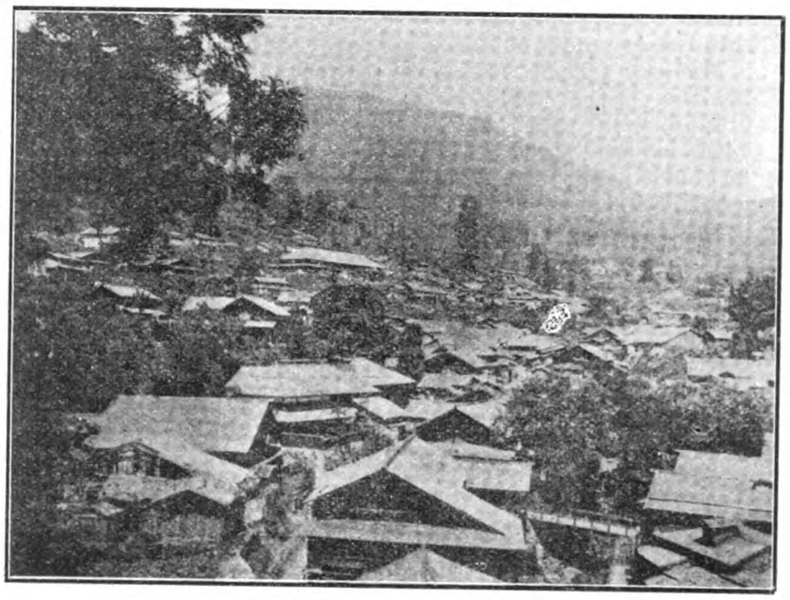
Reduction

Ores: The dressed ores treated here are chiefly chalcopyrite, associated with quartz and iron pyrites at the rate of 40% silica and 10% copper on average. The receiving ores are classified into four, viz. lumps, grains, sands and slimes, of which the first is only 10% of the total quantity of the ores. About 15,000 tons of ore treated annually in the reduction works, which indicates a production of about 1,400 tons of copper.

Smelting process: The fines are first moulded into briquets and after the drying of the briquets is over, they are roasted in open stall with lump ores. The roasted ores and the grains in a raw state are smelted in blast furnaces with a limestone and *Mabuki* slag, using coke as a fuel. The resulting matte is blown into blister copper by the so-called *Mabuki* process: The



ENTRANCE TO TSUDO ADIT LEVEL, ASHIO



GENERAL VIEW OF INNAI SILVER MINES

Kaei and Mokichi levels:—The former is opened on the back of the Kozama River, and being driven along Irodate vein, is the lowest drainage and transportation level. The latter is situated at an elevation of 240 ft. above the former, and cutting through Irodate vein, reaches to Gonnosuke-okuhi vein. Moreover, there are two levels between the Kaei and Mokichi and three levels above the latter. All these levels are connected with winzes.

Ichinomata Mine.

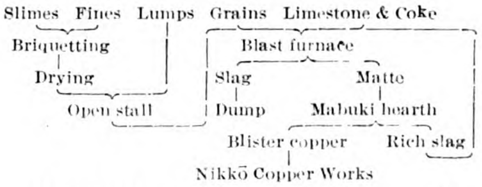
Suidoko adit:—It is driven by a crosscut at first and then after proceeding along the Shōgorōhi vein, crosscuts several other veins. It is 7 ft. high, 8 ft. wide and 6,600 ft. long, and is the most important transportation and drainage level. There are ten levels above the adit, which are connected with winzes.

Working method. There are three methods of working, viz. stoping, dressing plant in Kosawa Mine; Kayakusa dressing plant in Kayakusa Mine; Koganehira dressing plant, Motosawa dressing plant and Chuoko dressing plant in Magi Mine; Amaike dressing plant, Tsunohikizawa dressing plant and Kaei dressing plant in Sammai Mine; Ichinomata dressing plant in Ichinomata Mine.

Among these, Manaita and Kayakusa dressing plants are equipped with complete dressing machinery which is driven by a Pelton water wheel of 70 H.P. the process is described in the accompanying scheme.

The entire plants treat daily 54 tons of crude ores which carry 4½% copper and produce 38 tons of concentrates of 10% copper.

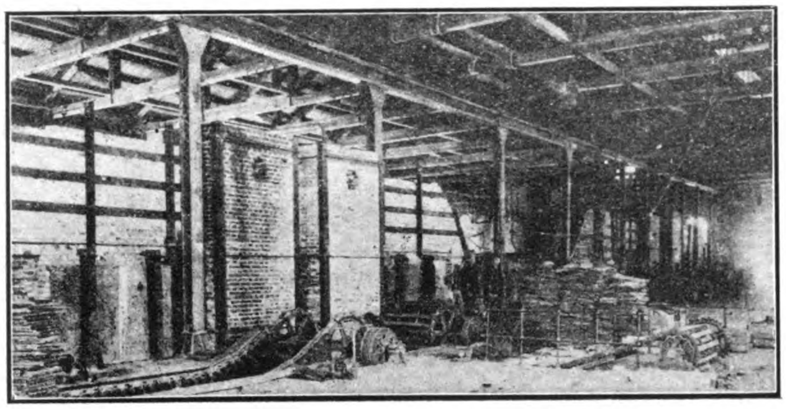
Each dressing plant has its own precipitating pond in order to settle suspended matter from the waste water. The rich and available parts of the precipitates are sent to the reduction scheme shows the reduction process:



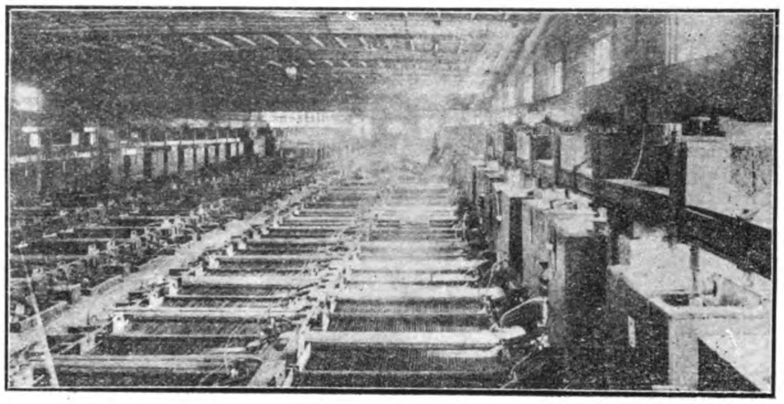
Briquetting and Roasting. The materials for briquetting are of the sands and slimes. The materials are mixed with enough water and clay for proper moulding, and are then moulded in cast iron moulds into briquets.

The lumps and the briquets are heaped alternately in open stalls and fired. The dimensions of an open stall are 8 ft. wide 12 ft. long and 6 ft. high and one charge is 56,000 lbs. of ore. The roasting takes three weeks.

Smelting. There are two blast furnaces partly water-jacketed; one is oval in form, 8 ft. 3 inches × 36 inches at the tuyeres, the other is rectangular,



FURNACE HOUSE SHOWING CASTING APPARATUS, NIKKO COPPER WORKS



TANK ROOM, NIKKO COPPER WORKS

5 ft 5 inches × 36 inches at the tuyeres, and the smelting capacity of each is 45 tons and 30 tons in 24 hours respectively. The air blast is delivered by two No. 6 Roots blowers to the blast furnaces and the *Mabuki* hearths. The resulting matte of 40% copper is tapped into a matte-pot and then is charged into the Japanese *Mabuki* hearth.

Mabuki. There are seven *Mabuki* hearths. Each hearth is made in the ground with walls of stone cemented with clay and lined with brasque, and has one tuyere. The dimensions of the hearth are 3 ft. in diameter and 1 ft. 6 inches in depth, and the diameter of the tuyere is 2½ inches. The hearth receives a charge of 7,000 lbs. of molten matte. The molten matte is poured from the matte-pot into the hearth, the blast is started, and the *Mabuki* operation is completed every 24 hours. The blister copper contains 98% copper and 0.11% silver.

The blister copper is sent to the Nikko Copper Works and refined by an electrolytic method.

Power

Hydraulic power of 100 H.P. and hydro-electric power of 400 H.P. are used at present. In a hard winter and dry summer, steam power is used to supplement the lack of water power.

A hydro-electr c power plant of 1,000 H.P. is now being erected at Hitachinai.

Transportation

The communication between all mines and the reduction works is done chiefly by a light railway, and the transportation of goods between the mines and the station Putatsui of the Imperial Government Railway, is carried on by the River Ani for 20 miles, except in winter time when it is done by sleighes.

FUROKURA COPPER MINES

(Annual production 1,300 tons of copper)

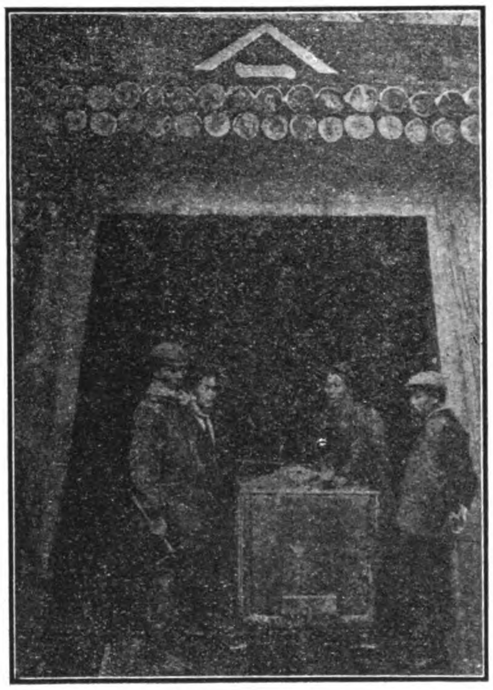
Location.

The Furokura Copper Mines are in the village of Ōyu-mura, in Akitaken. The mines are located on the western slope of the median mountain range in the north of Japan.

The Area of the concession is about 2,200 acres. The mines are divided into two, viz. Furokura proper and Hosoji. The reduction works are situated on the opposite side beyond the mountain range.

History.

The Furokura Copper Mines were discovered by Shōemon Tateyama in 1681, but the working was intermittent, and the production insignificant until they came into the hands of the Nambus—the feudal lords. In 1765, the lord attempted to improve the mines, but unfortunately a disaster in the shape of a terrible famine visited the north of Japan in 1784, and at last they were abandoned in 1794. In 1887, the northern part of the mines—Furokura proper—was purchased by the late I. Furukawa, and in 1904 the southern part—Hosoji—came into the possession of the late J. Furukawa. After the amalgamation of both parts, the mines were developed quickly, and the production has been increased to 1,300 tons per year, since the discovery of the large vein called Shijūnenhi, and the future promises well.



ENTRANCE TO TSUDO ADIT, MIZUSAW A COPPER MINES

Geology and Ore Deposit.

The geological formation of the mines is Tertiary tuff, shale and andesite. The lodes of the mines are the quartz veins which run through all of the rocks. Among them Hompi is the champion lode, which extends through the mines of Furokura proper and Hosoji. It strikes N 30°—40° E and dips steeply N W or S E. The thickness varies from ¼ ft. to 12 ft., and the length is about 5,000 ft. In the middle part of the vien Hompi, there is a branch called Shijūnenhi whose strike is N 60° W and dip is 60° to S. The Shijūnenhi is being excavated now.

The chief minerals are chalcopyrite, and pyrite, and the vein stuff is quartz. Micaceous hematite occurs with the quartz, and sometimes calcite is found in druse. Rarely zincblende and galena occur with the pyrites.

Mining.

Main Levels and Shafts.

Furokura proper.

Ōgiri level:—It is driven along the strike of Hompi, 5 ft. wide, 7 ft. high and about 4,000 ft. long. It is the lowest and most important level for the transportation and drainage in the mine.

Kyūshichi level:—It is situated at an elevation of 260 ft. above the former and is also driven along the Hompi, 4 ft. wide, 7 ft. high and 3,700 ft. long. Besides these there are five levels in the mine, which are connected by several winzes.

Ōgiri and Kyūshichi inclined shafts:—The former shaft (4 ft. × 13 ft.) connects the said two levels, and the latter (4 ft. × 13 ft.) connects the Kyūshichi and the lowest level of Hosoji Mine.

(To be continued)

A NEW SUGAR FACTORY IN NEGROS

(Continued from page 94)

where it is limed, neutralized, heated to the cracking point, and the sediment and scums drawn off to the filter press tank, and the clear juice to the clarifiers, and supply tanks, preparatory to its passing through the Triple Effect vacuum evaporating apparatus. The density of the juice entering the Triple Effect was about 9 to 10 degrees, Beaumé, the effects working under a vacuum of 5, 15 and 26 inches in the first second and third pans respectively, discharging the juice into the Vacuum Pan supply tank at an average density of 28 degrees Beaumé. The Vacuum Pan working under a vacuum of 27 to 28 inches, turned out a strike for the centrifugals in somewhat less time than was anticipated.

After eliminating the molasses from the massacuit in the centrifugals, the sugar is conveyed to the store room dumped on the floor, throughly mixed and then bagged. The molasses is pumped to the Blow-ups, treated and returned to the Vacuum Pan for securing the second product. A series of cooling tanks are used for the crystallization of the second and third products, which are remelted and converted into first products by mixing with the juice in the Vacuum Pan supply tanks.

The sugars produced at the "San Antonio" are finding a ready local market, as well as the molasses.

The plant is designed so as permit of increase to any capacity when required and due to the success of this first experiment with modern methods resulting in increased output at higher values, there is every indication that in a short time, this installation will have to be doubled, thus paving the way for a fair sized central factory in a locality where the cane is unusually rich, and ample land awaiting caltivation.

(*Continued from page 61*)

XV. Bibliography.

1 **Baber, E. Colborne:** Travels and Researches in Western China, *Royal Geographical Society Supplementary Papers*, Vol. I., Pt. I.
2 **Bogdanovitch:** Materialen zur Geologie Russlands, *Zeitschrift für praktische Geologie*, Vol. VII, p. 240 (1899).
3 **Brelich:** Chinese Methods of Mining Quicksilver, *Transactions of the Institution of Mining and Metallurgy*, Vol. XIV, p. 483 (1904-05).
4 **Clark, Ellis:** Notes on the Progress of Mining in China, *Trans.*, XIX, 571 (1890-91)
5 **Coldre, Louis:** Les Salines et les Puits de Feu de la province du Se-Tchoan, *Annales des Mines*, Ser. 8, Vol. XIX, p. 441 (1891).
6 **Collins, W. F.:** Tin Production in the Province of Yunnan, China, *Transactions of the Institution of Mining and Metallurgy*, Vol. XIX, p. 187 (1909-10).
7 **Collins, W. F.:** *Mineral Industry.* Vol. XVIII, p. 672 (1909).
8 **Cordier Henri:** *Bibliotheca Sinica* (1904).
9 **Curle, J. H.:** *Gold-Mines of the World* (1899).
10 **Drake, N. F.:** The Coal-Fields around Tsê-Chou, Shansi, China, *Trans.*, XXX, 261 (1900).
11 **Drake, N. F.:** The Coal-Fields of North-eastern China, *Trans.*, XXXI, 492 (1901).
12 **Duclos:** *La Mission Lyonnaise d'exploration commerciale en Chine*, 1895-7. pp. 263 to 314 (Lyons, 1898).
13 **Garrison, F. Lynwood:** *Mining and Metallurgy*, Feb. 15, 1901, p. 106.
14 **Garnier:** *Voyage d'exploration en Indo-Chine*, Vol. I, p. 230 (1867).
15 **Hoover, H. C.:** Metal Mining in the Provinces of Chihli and Shantung, China, *Transactions of the Institution of Mining and Metallurgy*, Vol. VIII, p. 324 (1899-1900).
16 **Hoover, H. C.:** Kaiping Coal Mines and Coal Field, Chihli Province, North China, *Transactions of the Institution of Mining and Metallurgy*, Vol. X, p. 419 (1901-02).
17 **Hosie, Alexander:** *Three Years in Western China.*
18 **Hosie, Alexander:** *Manchuria, Its People Resources and Recent History.*
19 **Huc, E. R.:** *Travels in Tartary, Tibet and China.*
20 **Inouye, K.:** *Geology of the Southern Part of Sheng-ching Province* (Tokyo, 1905).
21 **Jack:** *Back Blocks of China.*
22 **Johnston:** *From Peking to Mandalay.*
23 **Jameson, C. D.:** Coal and Iron in Eastern China, *Engineering and Mining Journal*, Vol. LXVI, p. 365 (1898).
24 **Kwang, K. Y.:** The Kaiping Coal-Mine, North China, *Trans.*, XVI, 95 (1887-88).
25 **LeClère, M. A.:** Étude Géologique et Minière des Provinces Chinoises voisines du Tonkin. Paris, 1902. *Annales des Mines*, Ser. 9, Vol. XX, p. 287 (1901).
26 **Le Prince-Ringuet:** Etude Géologique sur le nord de la Chine, *Annales des Mines*, Ser. 9, Vol. XIX, p. 303 (1901).
27 **Lorenz, Th.:** Beitrage zur Geologie von Ostasien. *Deutsche Geologische Gesellschaft*, Vol. LVII, p. 475 (1905).
28 **Maclaren, Malcolm:** *Gold*, p. 270 *et seq.* (1908).
29 **Margary, A. R.:** *Journey from Shanghai to Bhamo* (1876).
30 **Moller, W. A.:** The Fushun Colliery, South Manchuria, *Trans.*, XLI, 241 (1911).
31 **Monod, G. H.:** Coal Fields of Indo-China, *Revue Métallurgique* (Sept. 19, 1904).
32 **Murdoch, J. V. B.:** Brine and Oil Wells in Western China, *Transactions of the Institution of Mining and Metallurgy*, Vol. IX, p. 362 (1900-01).
33 **Pervinquiére:** *Revue Scientifique*, Ser. 5, Vol. I, p. 547 (1904).
34 **Prejevalski:** *Travels in Mongolia.*
35 **Pumpelly, Raphael:** Geological Researches in China, *Smithsonian Contributions*, Vol. XV, p. 118.
36 **Purington, C. W.:** Northern Manchuria, *Mining Magazine*, Vol. IV, p. 53 (1911).
37 **Read, T. T.:** Coal Mining in China, *Mining and Scientific Press*, Vol. XCVIII, p. 44 (1909).
38 **Read, T. T.:** Coal Mining in Manchuria, *Mining Magazine*, Vol. I, p. 215 (1909).
39 **Read, T. T.:** Mineral Resources of Manchuria, *Mining Magazine*, Vol. II, p. 121 (1910).
40 **Read, T. T.:** Steel Making in China. *Mining Magazine*, Vol. II, p. 199 (1910).
41 **Read, T. T.:** Iron Ore Resources of the Chinese Empire, in *The Iron Ore Resources of the World*, pp. 915 to 924 (Stockholm, 1910).
42 The Lanchow Mining Co., Ltd. *Far Eastern Review*, Vol. VIII, p. 41 (July, 1911).
43 **Richard, L.:** *Comprehensive Geography of the Chinese Empire* (Shanghai, 1908).
44 **Richthofen, F. F. von:** *China. Ergebnisse eigener Reisen und darauf gegründeter Studien* (1877).
45 **Richthofen, F. F. von:** Letters to the Shanghai Chamber of Commerce, 1872 (Shanghai, 1903).
46 **Rocher:** *La Province Chinoise du Yunnan* (1879).
47 **Shockley, W. H.:** Notes on the Coal-and Iron-Fields of Southeastern Shansi, *Trans.*, XXXIV., 841 (1904).
48 **Swensen, K. P.:** The Pinghsiang Colliery, *Mining and Scientific Press*, Vol. CI, p. 564 (1910).
49 **Verschoyle, W. D.:** Gold Mining at Wei-hai-Wei, China, *Engineering and Mining Journal*, Vol. LXXXII, p. 919 (Nov. 17, 1906).
50 **Vogelsang:** *Petermanns Mittheilungen*, Vol. XLVII, p. 245 (1901).
51 **Von Cholnoki:** *Földtani Közloni*, Vol. XXIX, p. 289 (1900).
52 **Williamson, Alexander:** *Journeys in North China, Manchuria, and Eastern Mongolia*, 1870.
53 **Willis, Blackwelder, and Sargent:** *Research in China*, 1907. (Published by the Carnegie Institution.)
54 **Willis, Bailey:** The Mineral Resources of China, *Economic Geology*, Vol. III, pp. 1 and 118 (1908).
55 **Woo, Y. T.:** Silver-Mining and Smelting in Mongolia, *Trans*, XXXIII, 755 (1903).
56 **Woo, Y. T.:** The Manufacture of Coke in Northern China, *Trans.*, XXXVI, 661 (1906).
57 **Yule, Sir Henry:** *The Book of Ser Marco Polo, the Venetian* (1875).
58 **Fox, H. H.:** Memorandum on Chinese Mines, *Diplomatic and Consular Reports*, No. 680 (London, 1911).

INDUSTRIES

PHILIPPINE ISLANDS

Button Factory.—The La Concha Button Manufacturing Company has been incorporated under the laws of the state of Delaware for $125,000 U.S. currency of which $110,000 has been subscribed and paid. The Board of directors of the La Concha Button Manufacturing Company are: Benito Valdez, Clement Schwinges, E. E. Elser, B. W. Cadwallader, and G. Maulinig. The officers are Benito Valdez, president; Clement Schwinges, vice-president and general manager; and E. E. Elser secretary-treasurer. Work on the new factory on calle Bilibid Vilja, Manila, has been commenced, Messrs. Merritt and Wilson being the contractors. The button machinery is of the latest American type and will turn out 10,000 gross of buttons per week, employing 200 workmen.

Standard Oil Warehouse.—The Standard Oil Co., is to build warehouses at Pandacan at a cost of P92,000. They will be of reinforced concrete and steel, and will replace those recently destroyed by fire.

Building and Loan Assn.—The Manila Building and Loan Association held real estate loans at the end of its last financial year to the value of P 500,275 as compared with P 381,827 for the previous year. The total assets of the Company are P 500,275.

Insular Supply Company.—A new firm the Insular Supply Company, has been formed by the co-operation of D. H. Steward and the firm of Smith and Blossom. The firm has already started the erection of a building which will house the Manila candy factory, the Tin shop of Smith and Blossom and several smaller industries.

New Soap Factory.—An area of 3,800 square meters has been purchased in Tanduay, P. I., on which it is intended to erect a large soap factory. Various kinds of soaps, both toilet and laundry, will be manufactured.

Philippine Vegetable Oil Co.—The new concrete and steel structure of the Philippine Vegetable Oil Company will soon be ready for the installation of the plant. The machinery is being supplied and installed by Frank L. Strong, the well known consulting engineer. The plant when finished will be one of the best equipped and promising enterprises in Manila.

Manila Cigar Trade.—The extent to which the Manila cigar trade is prospering is shown by figures issued by the Philippines bureau of customs. The cigars exported during eleven months of the fiscal year 1912 totalled 157,203,000 as against 122,130,000 in the corresponding period of 1911. The monetary appreciation was $902,432.

Iloilo Water Supply.—Tentative plans have been prepared to provide Iloilo with a gravity system of water supply. The estimated cost is P1,250,000 to P1,500,000 Means to finance the proposal have yet to be found.

Water System for San Pablo.—Plans have been prepared for a gravity supply of 2,500,000 gallons of water daily for the town of San Pablo, Batangas. The cost is estimated at P90,000. The source is the Cabunsod springs, about six kilometres from the town.

Tarlac Plantation Co.—With a capital of P50,000 the Tarlac Plantation Co. has been formed to operate in Tarlac. The organisers are Walter E. Olsen, G. C. Bender, Thos Embry, A. Ramirez, and J. C. Hermann.

Planting Co.—Fourteen Pagsanjan landowners have pooled their holdings and formed a corporation for the purpose of cultivating more extensive properties. The new company is capitalized at P10,500 fully paid in.

Building Sugar Centrals.—Mr. Stoddard has arrived in Manila from Honolulu to look after the interests of the Honolulu Iron Works in the Philippines. The Pacific Commercial Co. is representing that Company there and have deals for three sugar centrals about consummated. The erection of these plants will keep Mr. Stoddard busy for some time to come.

The Pacific Commercial Co. has acquired the American Hardware and Plumbing Co., Manila, buying out the half interest of Henry M. Jones. The business will be conducted under the old name.

New Sugar Company.—The San Carlos Sugar Milling Company has been formed with a capital of $400,000 to manufacture sugar in the Philippines. The Company was organised at Honolulu, and will operate in the Southern belt of the Islands.

Amalgamation.—The Philippine Construction Company is to absorb the interests of the Manila Construction Co., Oscar & Campbell and J. E. Ainsworth. The capital will be P500,000.

Eastern Trading Co.—This concern, which has been in business in Manila for some time has been incorporated with a capital of P75,000.

Soap Company.—The Philippine soap Company will spend P30,000 remodelling its buildings, and will then extend its manufactures to fine toilet as well as bath and laundry soaps. Thomas J. Wolff is the President of the Company.

Loaog Bridge.—An allotment of P50,000 has been made available for the erection of the Loaog bridge on the Manila North road.

Columbia Club House.—The Columbia Club proposes to expend from P20,000 to P30,000 on extensions to their club House.

Capiz Statehouse.—The new provincial building at Capiz was inaugurated on the Fourth. The total cost of the building was P114,795,77.

Fireboats for Manila.—The Manila Municipal Board is considering the purchase of fireboats at a cost of P150,000. Two boats have been recommended, equipped with larger pumps, at a cost of P16,000.

Business Houses for Manila.—W. J. Odom sent in the lowest tender for the erection of the block of buildings to be known as the kneedler block. His price was P115,816 to be finished in eight months. P119,000 in seven months. The block will be modern reinforced concrete four storeys high.

Sugar Mill.—A million peso sugar mill is contemplated for the Calamba sugar estate, Laguna province, which was purchased recently by John M. Switzer.

Tarlac Irrigation.—An allotment of $600,000 has been authorised for the completion of the San Miguel irrigation system in Tarlac. It is hoped to have the system completed in August, 1913. The larger part of the area to be irrigated comprises the Luisita estate of the Compania General de Tabacos de Filipinas. The system at present planned will cost not less than P1,000,000.

Jaro River Bridge.—J. E. Ainsworth was the only one to bid for the Jaro River Bridge—two steel spans 39.62 metres (130 feet) on concrete substructure. The price is estimated about P22,000. W. H. Lambert & Co. of Iloilo have the contract for the superstructure steel.

Steel Electric Cars.—Three handsome steel passenger cars of latest design are now in commission on the Manila Electric Railway. They were manufactured by J. G. Brill & Co., of Philadelphia. The cars are fitted with side vestibule doors, under the control of the motorman.

Calumpit River Bridge.—The Manila Railroad Company is building a new bridge at Calumpit, over the Calumpit river, the bridge is being extended on each side by a roadbed to be used for foot passengers and wagon road.

Roads in Cavite.—The five kilometers necessary to complete the road from Dasmarinas to Silang, Cavite, will soon be under construction, due to an insular allotment of P30,000 made for that purpose. It will give a direct outlet for that section of Cavite to the railroad at Bacoor, and provide a desirable highway from Silang direct to Manila. There has been P85,000 already spent on the construction of this road, but it had to be abandoned on account of a shortage of provincial funds.

Quingua Bridge.—The Atlantic Gulf & Pacific Co. have recently been awarded the contract for the furnishing of the fabricated steel for the super-structure of a bridge over the Angat River, at Quingua, on the Manila north road. The bridge will be three steel spans of 39.62 meters (130 feet) on concrete substructure. Tenders are asked for erection of the super-structure and construction of the sub-structure.

Record Copra Crop.—O. P. Barrett Chief of the experiment division of the bureau of agriculture on his return from San Pablo to Manila said: "My recent visit to the coconut district inclines me still further to believe that the Philippine coconut will endure ill treatment and bad weather than the same tree in any other country of the world. The outlook for a record copra crop for 1912 is practically assured. In the districts of Laguna and Tayabas the output of this year will be surprisingly better than last year; in fact, in some districts it may be nearly double the 1911 crops. There is, however no prospect of decrease in price, which to the motto 'Plant coconuts, then some move and take care of them.—and you will live happy ever after.'"

Pumps and Boilers.—A contract for two compound pumps at $648.00 each has been awarded to F. L. Strong by the chief Quartermaster at Division Headquarters, Manila. The same authority also gave Fred. Wilson & Co. the contract for four portable scatch boilers at 1,570 each.

Artesian Wells.—For the year ended June 30, 1912, the artesian wells division of the Philippines bureau of public works, drilled 102 wells. Of this number 80 were successful and the remaining 22 were unsuccessful. The cause of failure in the majority of unsuccessful cases was due to encountering salt water at a depth of from 500 to 1,000 feet.

Engineering Amalgamation.—On June 18, Messrs. Howarth Erskine Ltd., and Messrs. Riley Hargreaves & Co., Ltd. of Singapore issued notices that the two firms had amalgamated under the name "United Engineers, Ltd."

Beet Sugar Refineries.—Several prominent Tokyo businessmen are organizing a beet sugar refinery in Koshu, Korea. The concern is capitalized at Yen 5,000,000. The promoters also contemplate founding another sugar refinery in Manchuria to work upon beets raised in Kirin province.

Agricultural College.—Bids for the projected electric light plant for the agricultural college at Los Banos were opened at the Philippines bureau of public works on July 4. The following bids were received:—Pacific Commercial Company £8,800 in 175 days; E. C. McCullough and Company £12,548 in 120 days; Frank L. Strong 10,400 in 150 days and Germann and Company £8,335 in 125 to 150 days.

CHINA

Canton Trams—Frederick W. Cox, an American Engineer, has obtained a signed promise from the Governor-General of Kwangtung that the proposed tramway at Canton, which will cost about ten million dollars, will be financed with American capital.

Chinese Engineering Mining Co.—The extraordinary general meeting of this company to confirm the amalgamation with the Lanchow Mining Co., was held on June 13 in London. The proposal to go into liquidation and form a new company on the basis of the amalgamation was agreed to unanimously. The chairman (Mr. W. F. Turner) announced that in the liquidation a dividend of 1s. 6d. per share would be paid in respect of the profits of the company up to June 27, 1912.

Canton Cement Factory.—Owing to the large and increasing demand the Cement Factory at Canton has had to institute the system of night work twice a week.

Shanghai Dock and Engineering Co., Ltd.—The net profits of this company for the year ended April 30, 1912, amounted to Tls. 160,766.29. A dividend of Tls. 3 per share was declared, absorbing Tls. 165,600, and Tls. 4,166,29 was carried forward. Last year the dividend was Tls. 2½.

Sericulture in Korea.—The Government of Korea last year granted subsidies aggregating Y 13, 507 for the encouragement of sericulture. The results have been very satisfactory.

Yangtse Engineering Works.—When the revolution broke out the Yangtse Engineering Works had a contract from the Government for the building of several gunboats. The contract has been renewed, and Mr. Wong Kwong, the company's manager, arranged to go to Peking to discuss the financial arrangements with the Government.

Nagasaki Spinning and Weaving Co.—A meeting of the promoters of this company was held recently at Nagasaki, the capital required was estimated at one million yen, of which Y 35,000 would be used for purchase of land, Y 250,000 for buildings and Y 595,000 for plant. The annual receipts are estimated at Y 2,321,-250 and the expenditure at Y 2,147,775 including Y 1,032,975 for raw material. The balance of Y 173,475 would represent a profit of 17.3 per cent. on the invested capital.

Hokkaido Colliery and Steamship Co.—The directors of this company being anxious to raise Y 6,000,000 for the improvement of the property asked the Mitsui and Co., one of the biggest shareholders to take up Y 2,350,000 of the loan. The firm had already lent Y 1,350,000 to the company and it declined to make further advances until they knew more of the real condition of the company from independent investigation. The directors of the company have consequently resigned and it is thought in some quarters that this will give an opportunity to Mitsui and Co. to secure control.

Salt Works in Korea.—The Korean Government's salt works at Kunsan and other places have proved fairly successful and it is now thought that the Korean product, owing to the cheapness of production and superior quality can compete with any important salt. At present about three hundred million *kin* is consumed in Korea annually, of which two hundred million *kin* is produced locally and the balance is imported from China, Manchuria and Formosa. As soon as international agreements permit a salt monopoly will be established.

SHIPPING

Pasig Steamer and Lighter Co.—Messrs. Warner, Barnes and Co. are interested in this company, which has been capitalized at P 100,000. It is organized to conduct a general freight and lighterage business.

Zamboanga Warehouse Co.—This company has applied for a charter to carry on a general shipping business. The capital stock is P 21,500.

Zambales Steamship Co.—Chinese residents of Olongapo and Subig have organized this company with a capital of P 20,000 to operate the steamer Balayan between those ports and Manila. The headquarters will be at Olongapo.

Motor Vessel from Hongkong. — Mr. Meischke-Smith, of the Asiatic Petroleum Co.,

Ld., London, has placed an order with the Taikoo Dockyard Engineering Co., of Hongkong, for the building of the largest motor vessel which, so far, has been built outside of Europe, and Messrs. Olderup and Schluter, the representatives for the East of Messrs. J. and C. G. Bolinders, will supply the motor machinery. The principal dimensions are as follow:—Length, overall, 218 ft.; beam extreme, 32 ft.; and depth moulded, 9 ft. 6 in.

N.Y.K. fleet.—The Nippon Yusen Kaisha has recently bought two foreign steamers. One of these is a steel spar-deck steamer, the Hillcrag (late Bannockburn), 4,036 tons gross, built at Glasgow in 1908 by Messrs. Russell & Co. This vessel was beached near Dover in March, 1911, after a collision in the English Channel, and after having being refloated and repaired, was sold for about Y. 42,000 in September last to the Jetsam Shipping Co., of London, which has now sold her to the Japanese Company for about Y. 54,000. The other vessel is a steel 'tween-deck steamer, now being built by Messrs. Russell and Co., at Glasgow, to carry about 8,300 tons deadweight, and which has now changed ownership.

MINING

PHILIPPINE ISLANDS

Guamas Dredge Launched.—On July 1st the big dredge on the Guamas river was launched. The dredge is being installed by the New York Engineering Co. for the Philippine Exploration Co. which controls the property one the richest placer grounds in Paracale, situated on the Guamas river. The work of installation comprised the building of a railway from the coast to the side of the new dredge, the construction of a dam near tide water, another below the pit where the dredge was launched and another above as a sort of retaining wall. The dredge is 120 feet in length 40 foot beam and depth eight feet. Over 300,000 feet of timber was used in its construction. It was expected that the dredge would be in active operation within two months of the launch.

Bataan Coal Mine.—A new Company is to be organized to take over the affairs of the East Bataan coal mining company and to operate the mine for the benefit of the stockholders of the old company and the creditors of the organization. The new company has not as yet been organized, but all plans have been made for its formation. It is probable that Mr. Nolting will be the president of the new company, and that Colonel Harbord acting chief of the constabulary and A. T. Gillespie the broker will be on the board of directors. C. N. Orr the present manager of the mine will continue in his present capacity, he being a mining man of many years' experience in the United States. The present equipment with the apparatus and the mine is expected to be turning out 300 tons a day at the end of three months after starting. The capital of the new company is to be P50,000 for which bonds are to be issued.

Electrical Dredge.—A new electrically driven dredge has been purchased from Hongkong by H. E. Nelson for installation on the Mariquina River. It has a capacity of 1,000 cubic meters in 10 hours, lifting gravel from a depth of 24 feet at an angle of 45 degrees. The power will be supplied by the Manila Electric Railroad.

Hydraulic Gold Mining.—The Luzon Gold Company, which holds properties in Tayabas, Neuva Ecija, Rizal and on the headwaters of the tributaries of the Umirai River and Angelo River has introduced the hydraulic process. The plant now in operation consists of 300 yards of ditch flume and 60 yards of flume, delivering water to a penstock from which is taken a double line of hose carried across the river by a suspension bridge. One hose is used as a bank head and the other a nozzle head. Further plants are to be installed.

Junction Mining Co.—A company bearing this name has been formed in Manila to carry on mining operations in Surigao district, Mindanao. The company has been incorporated for P200,000. The prospects are said to be most favourable.

Umeari Gold, Limited.—A New South Wales corporation organized to operate on the Umeari river, northern Luzon, has been given a license to do business in the islands. Wolfson and Wolfson are attorneys for the company.

CHINA

Tayeh Silver Mines.—Rich supplies-of-ore are accessible at the Government silver mines at Lungkoshan. Workings have been started in six different places and plans are being devised for smelting furnaces to be erected in the vicinity, and a railway is to be made either to the river or to Wuchang.

Coal near Changchun.—A Chinese discovered recently a coal mine at a village called Huashihling situated at the south of Changchun. He is desirous of working the mine on share capital, and is reported to have sent some agents to Shanghai for the purchase of machinery, etc.

Siberian Tin.—German capitalists with the co-operation of the St. Petersburg International Bank have formed a company to exploit tin mines in the Transbaikal-Nerchinsk district, three and a half miles from the station of Olovyanka on the Transbaikal Railway.

Saghalien Coal.—The Duisky Coal mines in Saghalien are said to be the best in the whole Pacific region, both in quality of coal and wealth of deposits. The coal yields 71.01 per cent of coke and its heat productivity is given as 7,735.27 calories. It may compare with the best varieties of English or Scotch coal, being suitable not only as a steam raiser, but also for the coke it will yield for use in blast furnaces and for other metallurgical purposes.

Coke in Japan.—Owing to the limited supply of coke available from English and Germany the Japanese have established several special coke manufactories. Experiments have shown that the best coke is that produced from Kaiping coal dust. It costs about Y 13 a ton, while German coke cost Y 26 and English Y 24 a ton. The Kaiping coal dust is taken by rail from Tangshan to Chingwantao. The coal store at Chingwantao is connected with the wharf by two lines of railway, and steamers are enabled to take a load of 3,000 tons in twelve hours. About 541,810 tons are imported into Japan annually.

RAILWAYS

Kaiyuan-Taolu Light Railway.—As the outcome of a heated debate at the Fengtien Provisional Assembly the scheme for building a light rail line between Kaiyuan and Taolu was adopted in preference to the other plan of choosing Tiehling for the western terminus of the line. It was passed by a large majority that this light railway line should be extended further westward to Tungkiangkou, the river port on the Liao. The question of constructing another line between Taolu and Tiehling was left optional and permissible.

Military Lines in Kwangtung.—The Tutuh of Canton, Hu, has decided to construct military railways to connect the provincial Capital with the surrounding districts to the east, west and north. Lo Yi-chun has been appointed the chief surveyor to survey the lines.

Tientsin-Pukow Railway.—Its Southern and Northern Sections being connected, the Tientsin-Pukow Railway was opened to through traffic on the 21st ult. The time now required to go from Shanghai to Tientsin or vice versa is three days, but an express will run in the Autumn when the trip will take one day and a half.

Kirin-Chanchung Line.—It is estimated that nearly three million taels are necessary before this line can be brought into working order.

S.M.R. Co.,—The South Manchurian Railway Co. management has issued to its shareholders a circular notice calling them to pay in the third instalment of Yen 40 per share of Yen 200 by October 1st next. This, coming, as it does in the track of the second instalment called up on June 1st last, will bring up the total instalments called up to Yen 120 per share, viz., Yen 12,000,000 out of the total sum of Yen 20,000,000 subscribed to by the shareholders.

Oil on Railways.—The Federated Malay States railways have commenced trials with a locomotive burning oil fuel. Experiments with oil fuel were carried out on the Siam States Railway some years ago, and proved successful. There are running on the Petchaburi line between Bangkok and Hua Hin eight locomotives using oil fuel.

Penang-Kedah.—Construction has started at the Bukit Uertajam end of this line in the Straits Settlements. It is anticipated the survey of the whole line will be shortly concluded.

Saigon-Korat.—The French authorities in Indo-China are doing their utmost to bring about a decision in favor of connecting Saigon with Korat by rail, but the conservative Siamese are strongly opposing the proposal. It is hoped that within ten years time the Siamese network of lines will be completed, when it is hoped the Trans-Persian line will permit of through connection between Paris and Saigon.

Pnompenh-Battambong.—There are two proposals to connect these places in the South of Indo-China one that a line should run to the north of the Great Lake, the other that one should run to the south. A road is now being built along the south of the lake and that route is favoured for a railway. A mineral region is being exploited between Pnompenh and Battambong by a syndicate formed by the Banque de l'Indo-China.

Chinese Tramway Scheme.—A company is being formed to construct a tramway in the Shanghai native city. The line will run from the foreign settlement to the native city, and the city service will include a line round the site of the city wall. The wall is now being demolished. It has been arranged to purchase the materials through the Shanghai office of Messrs. Siemens China Electrical Engineering Co.

Shanghai Tramways.—The returns of the Shanghai Tramways (Foreign Settlement) for the week ended July 10 are as under:—

	1912.	1911.
	$	$
Effective receipts (after deducting loss by exchange)	15,065.80	12,145.06
Passengers carried	780,071	556,358
Car Miles run	54,047	45,148

The loss by exchange of subsidiary coinage for the week was equal to 25.36 per cent of the gross cash collected on the cars as compared with 23.40 per cent for the corresponding week last year.

German Railway Construction Co.—The Orenstein and Koppel-Arthur Aktiengesellschaft (for Railway construction especially the German colonies) for which Messrs. Beyn Meyer & Co. hold agencies has declared a dividend of 14 per cent as in 1910. The amount set aside for depreciation was increased from M. 700,000 to M. 1,760,000.

Chekiang Railway Debentures.—The general meeting of the shareholders of the Chekiang Railway held on June 11, passed a resolution for the flotation of debentures amounting to S.Y1,500,000. The debentures are to be issued at S.Y95 net with 5% or 5½% interest, and are secured with the receipts of the Hangchow-Chiahsing Railway and are redeemable in the course of 6 years.

The Shantung Railway.—The Shantung Railway Company of Berlin has declared a a dividend of 6 per cent., as compared with 6½ per cent. for 1910. This reduction was expected, because the revolution in China has influenced the receipts. The profit shares (Genuss-scheine) receive m.5 (1910, m.7½). The receipts of the railway for the month of April, 1912, amounted to $400,900 (Mexican), againts $354,000 in April, 1911, and the receipts for the first four months of the current year show a total of $1,517,000 (Mexican), being an increase of $276,000, or 22.24 per cent., on the corresponding period of the previous year.

Canton-Hankow Railway.—The final survey of the Wu-chang-Yochow section of the Canton-Hankow railway was begun on May 20. Two parties set out from headquarters, one in charge of Messrs. F. W. W. Valpy, Richards and Zandotti, the other under Messrs. M. R. Sinclair and Sandberg. The first party is working from Wu-chang, and will return to Hankow each evening while the work is close at hand. The second party went into camp about five miles from Wu-chang and is working southward from that point.

The remaining engineers, about twelve, will be sent out as soon as the necessary equipment arrives from Shanghai. The pegging out of the line to Yochow should soon be in full swing.

Kiakta-Kulun.—The negotiations for the proposed laying of the Kiakta-Kulun Railway having been brought to a satisfactory settlement, the work is expected to be commenced upon the completion of the construction of the Kiakta section of the TransBaikal Railway. The franchise for operating the proposed line has been transferred to the Russo-Asiatic Bank.

Peking-Hankow Railway Receipts.—The receipt in March from passenger fares on the Peking-Hankow line amounts to $225,732.35, and from freight $744,350.86. The total receipt for March amounts therefore to 970,082.21. For the first ten days in April last the total passenger receipt was $97,115.19, and freight receipt $281,715.19, while for the corresponding period in March last the passenger and freight receipts were $42,632.05 and 214,717.36 respectively. A glance at these figures will show that we have a very bright and promising future for all our railways says the "Peking Daily News."

Kowloon Railway Terminus.—The Hongkong government has made an extensive purchase of land for a railway terminus. It has closed a deal for the land of the Kowloon Land Reclamation Company and the property of the Hongkong and Kowloon Wharf and Godown Company, and will pay for the two the sum of $1,500,000.

This deal settles a question that has been hanging fire in Hongkong for many months. The Hongkong and Kowloon wharf and godown company owns the land immediately contiguous to the present temporary terminal and the Reclamation company, organized several years ago, purchased land in Kowloon reclaimed by the government, and is again selling it back to the government. The plans for the terminal call for extensive shops and sidings in Kowloon.

Proposed Railway from Chaochowfu to Hweichowfu. The consulate in its annual trade review in Daily Consular and Trade Reports for December 22, 1911, reported that a railway line from Chaochowfu, a prefectural city about 25 miles northwest of Swatow and connected with it by rail to Hweichowfu, another prefectural city, about 60 miles northwest of Kowloon (Hongkong), was under discussion. The recent revolutionary activity throughout the Province caused this, together with many other projects, to be temporarily abandoned, but, according to the Canton press (vernacular), the matter is being taken up again. It is reported that at a meeting of Hweichow and Chaochow merchants the following preliminary regulations for the proposed company were accepted:

1. That the name of the company should be the Merchants Hwei-Chao Railway Co. (Ltd.)

2. The length of the line shall be 246 miles (English), which will be divided into four sections as follows: First section, Chichshih Bay to Hweichow; second section, Hweichow to Haifung; third section, Haifung to Puning; fourth section, Funing to Chaochow.

3. The capital shall be $20,000,000 Mexican (about $9,100,000), to be divided into 4,000,000 shares.

4. The shares will be of three classes, namely, (*a*) 30,000 founders' shares, (*b*) 500,000 preferred shares, (*c*) balance ordinary shares.

Should this line materialize, it is reasonable to suppose that an extension will be made from Hweichowfu to connect with the railroad line into Canton. The prospects for raising so large a sum as $9,100,000 locally are not bright at present. So far as I can learn no survey of the route has been made, but there are few, if any, geographical difficulties. Chichshih Bay is on the coast about midway between Swatow and Hongkong. It is not open to trade, but is reported to be a good harbor. There was some talk of fortifying it as a naval base last year.

DOWNIE DEEP WELL PUMPS

The Keystone Driller Company, of Beaver Falls, Pa. U.S.A. has issued a tenth edition of its catalog on Downie Deep Well Pumps. In addition to their world wide reputation as the leading drilling machine manufacturers of America, this company is securing equal fame for their deep well pumps. These pumps are entirely independent of the well are suspended from the top; may be withdrawn at any time without disturbing the well, and all parts are always accessible for repairs. They are constructed on the principle that "anything worth doing is worth doing well."

Catalogue No. 6 sets forth the construction and operation of the pumps so clearly that any good mechanic should be able to install any of them.

SCHERZER ROLLING LIFT BRIDGES

Recent orders of the Scherzer Rolling Lift Bridge Company show a substantial and continued growth of business, and include many notable foreign orders, among which are a double track railway and combined highway bridge for the Great Central Railway, England, across the Trent River, having a movable span of 160 feet and a width of 53 feet 6 inches out to out. This bridge will be the widest and heaviest movable bridge yet constructed in Great Britain. Two Scherzer Rolling Lift Bridges have recently been completed for the Dublin Port and Docks Board at Dublin, Ireland, and a large railway and highway Scherzer Rolling Lift Bridge is nearing completion for the Swansea Harbour Trust at Swansea, Wales. The very large Scherzer Rolling Lift Bridge under construction across the Nile River at Cairo, Egypt, is rapidly nearing completion and is expected to be in service within a few months. The Buenos Ayres Great Southern Railway Company have recently placed under construction the fourth Scherzer Rolling Lift Bridge in the process of modernizing and extending their terminal facilities at Buenos Ayres. The South Indian Railway Company in the process of extending their line toward the Island of Ceylon are constructing a double leaf Scherzer Rolling Lift Bridge having a movable span of 225 feet.

Within the United States and Canada more than one hundred and fifty Scherzer Rolling Lift Bridges have been constructed and placed under construction. The more recent railroad bridges placed under construction include a double track bridge for the Central Railroad Company of New Jersey, a double track bridge for the New York and Long Branch Railroad Company, and bridges for the Southern Railway Company, Savannah, The Atlantic Coast Line, Navassa, North Carolina, Aransas Harbour Terminal Railway, Wildwood and Delaware Bay Short Line, the Canadian Pacific Railway at Fort William, Ontario, the Canadian Northern Railway across Salmon River and another across Rideau Canal.

The recent orders for electric railway and highway bridges have been especially numerous, including some very large and wide structures notably a double leaf structure at Toledo, Ohio, having a movable span of 211 feet center to center of bearings and a width of 70 feet; others at Lynn, Massachusetts; Huron, Ohio; Troy, Ohio; Minster, Ohio; Sagamore, Massachusetts; East Chicago, Indiana, Kimberly, Wisconsin.

All of these structures are designed by the Scherzer Rolling Lift Bridge Company, having main offices in the Monadnock Building, Chicago.

RESTORATION OF TELEPHONE SERVICE IN 98 HOURS

CENTRAL OFFICE IN KANSAS CITY TOTAL LOSS AFTER FIRE

The Missouri and Kansas Telephone Company's Fairmount Exchange at Kansas City, Missouri, was completely destroyed, on Sunday, October 22nd at 3 A.M., by a fire which is believed to have been caused by an explosion of gas in the house adjoining that in which the central office was located. The telephone company at once communicated with the Western Electric Company and the work of restoring service to the subscribers was begun at 9.00 o'clock of the same morning, when a dozen men from the electric company's local installing force appeared upon the scene.

The Hawthorne factory of the Western Electric Company was called upon by long distance telephone to make a hurry-up shipment, and responded by sending forward the necessary apparatus by express the evening of the day on which the fire occurred, thus supplementing without delay the work which was being done by the local house in rushing material to the building in which the new exchanged was to be housed.

The new switchboard equipment consisted of several sections from the telephone company's stock, and some from an addition which was to be installed at the Rosedale Exchange, on account of the increasing business in that district. Twenty-six installers reported for work on Monday morning, October 23rd, and from that time until the new boar was cut in service at 5.00 A.M. October 26th, with a full equipment of 800 subscribers' lines, a day and night crew were at work continuously.

Taking into consideration the fact that the work was done under high speed conditions, in order that the subscribers might not be inconvenienced for an extended period, it is worthy of note that the trouble reports issued as a matter of routine by the telephone company indicate that the work of the Western Electric Company's installing force was so well done that a minimum of trouble was experienced after the new equipment was cut into service.

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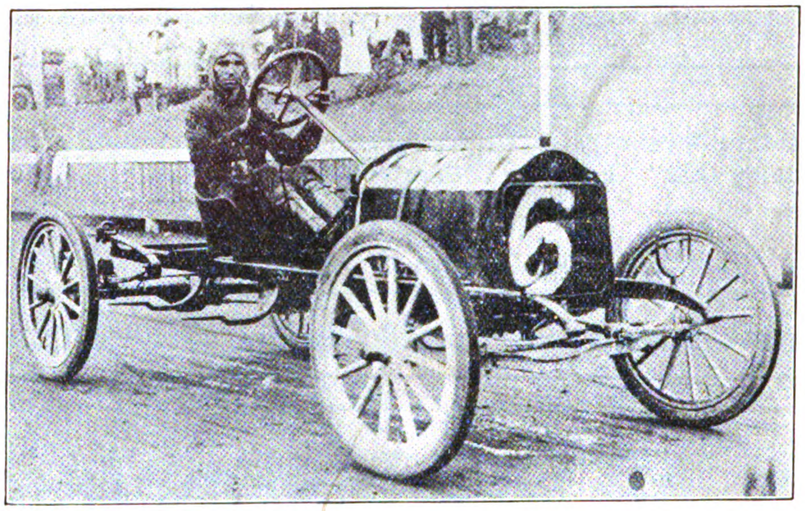

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THE FAR EASTERN REVIEW

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Engineering
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Vol. IX., No. 3. — SHANGHAI—MANILA — August, 1912.

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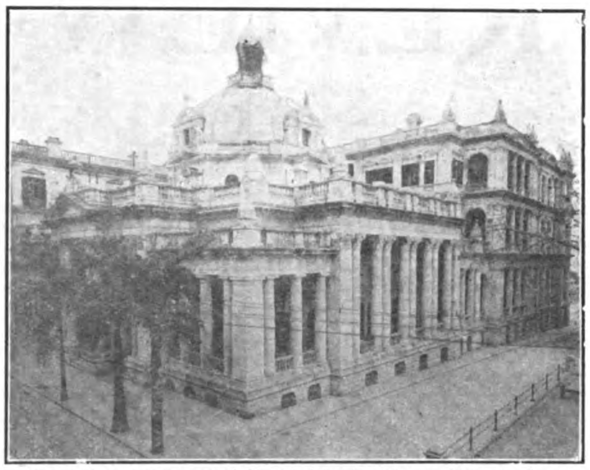

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

Vol. IX. SHANGHAI AND MANILA, AUGUST, 1912 No. 3.

FOREIGN ADVISERS FOR CHINA

Dr. G. E. Morrison

POLITICAL ADVISER TO THE CHINESE GOVERNMENT

Below we give brief sketches of the careers of the three foreign advisers already appointed by the Government of China. Although these appointments do not appear to have yet been promulgated in Presidential orders, there can be no doubt that they have been made, and in the case of Dr. Morrison at least, definitely accepted. These appointments mark the beginning of the adoption of a policy that will commend itself to all who wish China well. With foreign assistance she may hope in time to surmount the obstacles which obstruct her path. Without foreign assistance if she manages to surmount them at all, it would only be after vexatious and dangerous delays.

The appointment of foreign advisers to all the great departments of state will immediately react beneficially on China, as she will regain the confidence of the great Powers, which has been seriously impaired by recent events. It may be expected that further appointments will be made shortly. The name of Mr. W. W. Rockhill has been

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mentioned in connection with the general advisership. Mr. Rockhill like Dr. Morrison is a firm believer in China and the Chinese people, and has an invaluable knowledge of the country and its politics. Sir Francis Piggott, formerly Chief Justice in Hongkong and at one time adviser to the Government of Japan was mentioned for an appointment to the legal department but this post has since been tendered to Prof. N. Ariga, the eminent Japanese jurist. Sir Robert Bredon, whose career is too well-known to need emphasis, is mentioned in connection with the Customs. In connection with the Posts and Telegraphs Mr. Theo. Piry is spoken of. He has had the advantage of a very intimate and through knowledge of the department.

Commandant Brissand Desmaillets of the French Army has been nominated to the post of adviser to the President in military affairs, but the nomination has been objected to and the appointment of a military adviser seems to be in abeyance. This is the case also in regard to naval, commercial, agricultural and educational affairs. Now that a beginning has been made, however, it may be expected that substantive appointments of foreign advisers in all departments will shortly be announced and an important step thus taken towards the reorganization of China.

RAILWAY ADVISERS

To the readers of **The Far Eastern Review** the posts of Advisers to the Railway Department are probably the most important, as on the selection of competent and broad minded men for this work hinges to a large extent the future equipment of the projected network of lines which must cover the country. Several well-known men have aspired to this post.

The fear of creating a situation in the Railway Department where under given conditions, they could be compelled by diplomatic pressure, to cede permanent foreign control during the currency of existing railway loans has cause the Chinese to hesitate before committing themselves to accepting the services of a strong, capable Adviser. The danger of duplicating the conditions existing in the Customs, has been the real reason why China has steadily refused to employ a foreign railway consulting engineer, in this capacity. It is just possible that if China was approached from a different angle, and urged to employ foreign consulting engineers, general traffic director, or other specialists in their various departments all under the control of the Minister of Railways, and responsible to him alone, there would be some probability that the recommendations would receive more careful consideration.

The attitude of **The Far Eastern Review** towards the employment of Railway specialists under the name of Advisers, has already been set forth in previous issues. There is too much at stake for foreign manufacturers of railway material for us to advocate the appointment of any particular man for the post of general Railway Adviser, or Consulting Engineer. It is extremely difficult, if not altogether impossible, to find a competent railway engineer of any nationality free from the prejudices of his class, and who would give to manufacturers of countries other than his own, a square deal in the drawing up of specifications for materials.

To obviate the certain clash that would arise by the appointment of a Railway Adviser of any given nationality we are of the opinion that the one safe and sane course for the Chinese Government to pursue is to appoint a temporary commission of expert foreign railway engineers, composed of one British, one American, one European, and at least two of her own best men such as Jeme Tien-yu or Yen Te-ching, with full powers to draw up a standard set of specifications for the rolling stock and equipment of Chinese Government lines. Or, as an alternative, there must be some elasticity in the specifications drawn up by the engineers of various lines, that will permit manufacturers of all nations a fair chance to compete.

For the above reason **The Far Eastern Review** considers the appointment of any Railway Adviser whose powers would permit him to unduly discriminate against manufacturers other than those of his own nationality as inimical to the best interests of China. For the observance of Fair Play and the maintenance of the Open Door or principle of Equal Opportunity for all, and to avoid future ill feeling, which must lead to diplomatic protests on the part of foreign Powers, the course suggested above is the one safe guide for China to steer by.

This is the only phase of the matter which interests foreign manufacturers.

If China desires a Railway Expert, and avoid international friction in the future, there is ample scope for his useful employment in reforming the administrative and traffic departments of the service. Here awaits a brilliant field for some one to make a record in, providing China is willing to follow his advice. The appointment of a high class efficient Foreign Traffic Director who would devise some system of uniform rates and traffic management, and increase the earning capacity of the lines, would undoubtedly meet with the hearty approval of all national interests.

Mr. A.W.U. Pope, C.I.E., who has had 30 years experience in Indian Railways and enjoys a reputation justly earned as a capable Traffic Director and general Railway Manager, has been mentioned for a post in the Railway Department. Mr. Pope's work as General Manager of the S.-N. R. is reviewed at length in another column. His record on this line, speaks for itself.

DR. G. E. MORRISON

POLITICAL ADVISER

Perhaps no action of the Chinese Government could have placated foreign opinion more than the appointment as political adviser of Dr. G. E. Morrison. One of the greatest misfortunes that attended the earlier months of the Republic was the absence of a strong-minded, well-informed and sympathetic foreign adviser. The obstacle, of course, was the exaltation of mind that not unnaturally followed the destruction of Manchu power. The downfall of the dynasty which has been desired for so long seemed almost impossible of achievement, but when the spark of revolution was struck, the flames spread through the country with almost incredible rapidity. This sudden and spectacular success inspired in the Chinese a belief that they were mentally equipped to solve any problem that might be presented to them ; they considered that, as they had been able unaided to overturn a dynasty that seemed to be so firmly rooted that no political storm could affect it, they were qualified to navigate the ship of state without advice or assistance. The heavy weather that has already been encountered has caused a readjustment of these views, and the first practical outcome has been the selection of the famous *Times* correspondent as political adviser.

The choice is a most excellent one and will commend itself to Chinese and foreigners alike. The Chinese will be pleased, because Dr. Morrison has consistently shown a profound liking for, and a sympathetic understanding of, the people of China. Although representing a great British paper that enjoys an almost semi-official standing, Dr. Morrison has never allowed any desire to promote British interests to interfere with his determination to secure fair play for China. Those words, in fact, explain at once his policy and his success. Fair play for China has been his motto throughout, and although during the Manchu *régime* he fearlessly attacked nepotism and corruption in high places, it has been thoroughly recognised that he did this in the best interests of the country. The "predatory Powers" as those nations who had designs on China's territories have been styled, constantly squirmed under the lash of his pen. Russia's cynical and high-handed action in Manchuria was early exposed in *The Times* and this was by no means the only case in which Dr. Morrison played the part of unofficial watchdog of China's interests. The Chinese know that with Dr. Morrison as adviser they will have more than filled the gap left when Sir Robert Hart ceased active work. They have secured the services of a man whose intellectual capacity is recognized in every quarter of the civilized world; whose fearless integrity has been again and again manifested, and whose sympathetic understanding of the Chinese people will enable him to consider problems from their view point as well as weigh them on general principles.

Foreigners will hail the news of his appointment with gratification because his sympathy with the Chinese has never been able to subvert his judgment. Other men have yielded to the subtle fascination that the Orientals often exercise over Occidentals who begin to understand them, and the result has been that they became simultaneously pro-oriental and anti-occidental. The clarity of mind and soundness of judgment which characterize the eminent correspondent. have saved him from this fate, and any expression of opinion from him has been accepted without question as the genuine view of an especially well-informed and thoroughly unprejudiced observer, who had got close to the heart of Far Eastern things without losing a tittle of his sturdy individualism. Respected and trusted by Chinese and foreigners, Dr. G. E. Morrison in his new position will have a more extended field for the exercise of his great mental and moral qualities, and that he will add to his fame and place China under the heaviest of obligations to his sagacity and foresight is as sure as anything mundane may be—if he is given a free hand.

Dr. Morrison's career is too well known for it to be necessary to give here more than the slightest of sketches. He was born in Victoria, Australia, forty-five years ago, so he is comparatively a young man. That he was of an adventurous disposition was shown by his feat of walking across Australia when he was eighteen. Exploration in New Guinea next engaged his attention. The expedition was attacked by cannibals and Dr. Morrison received two serious spear wounds. While he was recovering from these wounds in Edinburgh he took his medical degree. Thereafter he worked on a schooner in the South Seas in order to study the Kanaka question; served as a purser on a vessel in the West Indian fruit trade, and for some little time enjoyed the distinction of being Court Physician to the Shereef of Wasan in Morocco.

His association with the *Times* came about in a strange but eminently fitting way. He owed his appointment to himself alone. After making a marvellous trip through China alone in 1894, he published a book "An Australian in China," describing his journey. This volume was read by the late Mr. Moberley Bell, the Manager of *The Times*, and he lost no time in getting in touch with Dr. Morrison and commissioning him to journey through Indo-China and the adjacent region and to supply *The Times* with special articles. The wonderful discrimination Dr. Morrison exhibited and his rapid assimilation of knowledge in connection with this work marked him out as the man to fill the important post of *Times* correspondent at Peking which was then vacant. This was offered to him and accepted, and a new force arose in China. Dr. Morrison in his capacity as correspondent has had to fight against powerful influences—the opposition was not always and altogether in quarters remote from his own legation—and he has been subjected to attacks open and covert. That he has always emerged successfully from struggles of this nature proves not only his magnificent courage, but the strength of the causes for which he elected to do battle. It will be remembered that Dr. Morrison's unique knowledge of Far Eastern affairs, which enabled him frequently to forestall the Foreign office, led to Lord Curzon describing Dr. Morrison's statements as "the intelligent articipation of events before they occur," a witticism that was untrue as it was cheap. Dr. Morrison was among the besieged in the British Legation during the Boxer rising and he did magnificent work in the defence. If anything he was too daring and he received another wound during one of the attacks.

China is to be congratulated on this appointment without any qualification or mental reservation. She has secured the services of a man whose reputation for sturdy courage and devotion to duty is beyond cavil, and whose power and desire to see her peaceful, happy, and progressive march hand in hand.

PROFESSOR NAGAO ARIGA

JUDICIAL ADVISER

No hope is more cherished among the Chinese tnan that the time will speedily come when extra-territoriality will be finally banished. Until this is done China cannot aspire to the status of a first class power. To reorganize and reform her legal system is the first step, and Professor Nagao Ariga, an eminent Japanese jurist, has been appointed judicial adviser to supervise the carrying out of this most important work, possibly in collaboration with Sir Francis Piggott. It is possible that the Government of China had in mind when making this appointment the conspicuous success that had followed the engagement of Dr. Tokichi Masao by the Siamese Government as legal adviser. As a member of the commission on the codification of Siamese laws which was appointed in 1898 Dr. Masao did invaluable work and the result, as readers may recollect, was the abandonment by Great Britain in 1907 of her rights of extra-territoriality in Siam.

The selection of a qualified Japanese jurist for this advisership is based upon the fact that Japan is the one country which has been confronted with similar problems to those which now face China and has overcome them. Extra-territoriality prevailed in Japan from the time that the country was opened up by Commodore Perry. The Japanese quickly realized that the only means of abolishing extra-territoriality was to remove the cause of its existence. Consequently they set to work, under

competent advice, to codify their laws and bring them up to the standard of the more advanced countries. Simultaneously they began to train men efficiently to fill the judicial positions. When the Powers saw that the safety of their nationals could be trusted to the laws of Japan and the administrators of those laws, they were unable to refuse the request for the surrender of their extra-territorial rights. A Japanese judicial adviser will be, consequently, invaluable to China at the present juncture as he will be able to explain the methods by which Japan succeeded in regaining her national independence.

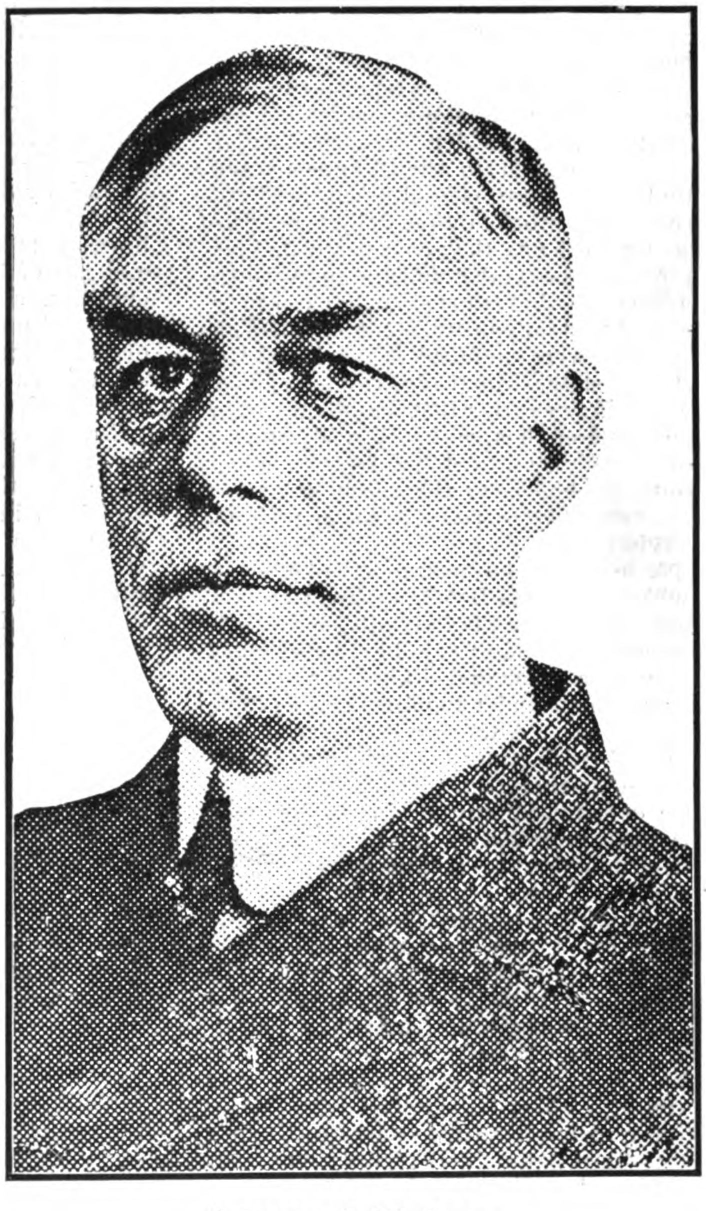
Of the professional qualifications of Professor Ariga to cope with the difficult problems that will be submitted to him, his past career furnishes conclusive testimony. He took his degree of Ph.D. at the Imperial University of Tokyo in 1882, and afterwards went to the University of Berlin, where he made a special study of National Jurisprudence. After his return to Japan he was appointed Secretary to the Privy Council, and he took a prominent part in the arrangements for putting the constitution in force. During the war between Japan and China, he became adviser on international law to the General Commanding the Second Army. Subsequently, while on a visit to Paris, he published in French "An Essay on International law concerning the China-Japan War." In 1893 he was appointed lecturer on International Law at the Imperial Military College, and in 1899 was the representative of Japan at the Peace Conference in London. During the Russo-Japanese War Professor Ariga's advice on questions of international law was frequently requisitioned and he was officially attached to the Manchurian forces as adviser.

Professor Ariga has written a large number of books on jurisprudence, international law, sociology, etc. Among his better known works are "A History of Modern Diplomacy," "The Diplomatic History of the Last Thirty Years" and "Commentaries on the laws of Acient Japan." Professor Ariga is a native of the Settsu province of Japan and was born in 1860.

Professor Nagao Ariga
JUDICIAL ADVISER

PROFESSOR J. W. JENKS
FINANCIAL ADVISER

In view of the precarious position of China at the present time the choice of the best available authority as financial adviser was of paramount importance. The influence for good that can be exercised by a thoroughly competent and high-minded financial adviser is scarcely less than that which will flow from the office of the political adviser. China will be made or marred by the political and financial policy she follows during the next few years. Therefore the selection of Professor J. W. Jenks as financial adviser to the Government has



Professor J. W. Jenks
FINANCIAL ADVISER

been welcomed by all well-wishers of China, foreign or native. It is true that Professor Jenks cannot claim the long and intimate acquaintance with China and the Chinese that will prove of such inestimable service to his colleague in the political department, but he has made a special study of China's finances, especially in regard to the currency problem, and probably no foreign expert living knows more about the subject which will be his especial care. The exhaustive examination he conducted in 1903 and 1904 in connection with the currency question led to the submission of a most valuable report containing recommendations for reform, including the establishment of a gold standard. Probably Mr. Jenks will devote his attention in the first place to getting something like order out of the currency chaos, and success in the work alone would be sufficient to establish his claim to be considered as a lasting benefactor of China. The international financial engagements of China are so complicated that it will require all Professor Jenks energy and accumulated experience to reduce them to a system. Necessarily allied with this is internal finance. It has long been a belief of well informed foreigners, including the late Sir Robert Hart, that an equitable land tax alone, while actually decreasing existing burdens, would return a revenue sufficient to pay all China's administrative expenses, provide for the payment of interest on foreign loans and the establishment of a sinking fund. It may be that when Professor Jenks brings his expert knowledge to bear upon the data collected by the Finance Department he will be able to solve the domestic financial problems in a manner more satisfactory than now seems within the bounds of hope.

A brief sketch of Professor Jenks' career will be of interest. Jeremiah Whipple Jenks was born in St. Clair, Michigan, on September 2, 1856. He took his A.B. degree at the University of Michigan in 1878 and his A.M. degree in 1879. Admitted to the Michigan Bar in 1881, he taught Greek, Latin and German at Mt. Morris College between 1879 and 1880 and between 1881 and 1883. He was professor of political economy and English literature at Knox College from 1886 to 1889; professor of political economy and social science at Indiana University 1890-91 and professor of political economy and politics at Cornell since 1891. In addition to his scholastic work Professor Jenks has been active in a wider sphere, as the following brief survey will show:—He was expert agent of the U. S. Industrial Commission on Investigation of Trusts and Industrial Combinations in U. S. and Europe, 1899-1901, and consulting expert of U.S. Department of Labor on the same subject; special commissioner War Department, to investigate questions of currency, labor, internal taxation and police in the Orient, 1901-2; special expert on currency reform of the Government of Mexico, 1903; member of the U.S. Commission on Internal Exchange in special charge of reform currency in China 1903-4, member of the U.S. Immigration Commission 1907.

He has been a voluminous writer and in addition to the numerous reports of Commissions which he edited and largely wrote, he has published volumes on subjects so remote from each other as "Great Fortunes, their winning and using" and "The Political and Social Significance of the Life and Teaching of Jesus."

Professor Jenks took his LL.D. at his Alma Mater in 1903 and his doctorate of philosophy was obtained at the University of Halle as early as 1885. He married in 1884 Georgia Bixler of Mt. Morris, Illinois.

MR. IVAN CHEN

MR. IVAN CHEN

Mr. Ivan Chen is the present Commissioner for Trade and Foreign Affairs in the foreign Settlement of Shanghai. He is the representative of the Peking Government. Mr. Chen was born in Honan in 1870, and commenced his study of English when he was 16, his foreign education beginning in the Kiangnan Arsenal School, Shanghai. As a result of a competetive examination he was selected by the Viceroy of Kiangsu to go to Peking to join the old Tsung Li Yamen, or Foreign Office, and in 1896 he was sent to England to study law. He joined Lincoln's Inn, London, in March, 1897, and was called to the bar in Nov. 1899. Upon the recommendation of Sir Chen Tung-liang, K.C.V.O., Chinese Minister in London, Mr. Chen was appointed by the Government to the position of student interpreter to the Chinese Legation in London, and from that time rose until he reached the post of First Secretary in 1905. In 1906 he was placed in charge of the Legation during the absence of the Minister for six months in China. In 1902 Mr. Chen was one of the International Exchange Commission initiated by the American and Mexican Governments with the object of devising a stable currency for China. Professor Jenks, now mentioned as Financial Adviser to China, was also one of the Commission. In 1904 Mr. Chen, with Sir Halliday McCartney, negotiated the Chinese Labor Convention for South Africa. In 1907 he was recalled from his position as First Secretary to the Legation to Peking to join the Foreign Office, and there participated in the negotiation of the Opium Convention of May 8, 1911. In the summer of 1911 he was appointed Taotai at Tengyueh, and had reached Rangoon, on his way to the distant post when the revolution broke out. Recalled to China he went into private life, and took no part in public affairs until peace had been declared, when he was asked by the then Minister of Justice, Dr. Wu Ting Fang, to preside at the first jury trial in China. The proceedings were conducted according to the rules of procedure obtaining in England. In May, 1912, Mr. Chen was called to his present post to succeed Mr. Wen Tsung Yao. The present disturbed state of affairs makes the duties of the Commissioner onerous in the extreme, but being diplomatic and tactful, and desirous of doing the correct thing in all matters, Mr. Chen succeeds admirably, when the chaotic state of things is remembered, in averting friction with

SIDELIGHTS ON THE MANAGEMENT OF CHINESE RAILWAYS

THE SHANGHAI-NANKING RAILWAY

Probably no railway in China has been subjected to more criticism than the line from Shanghai to Nanking, built under a loan agreement between the Chinese Government and the British and Chinese Corporation, Ltd. Most of these criticisms have emanated from the Chinese, and arose primarily because of the capital cost per mile of line, which, including flotation expenses, purchasing commissions, interest and other charges exceeded the cost of other similar lines constructed in China. The charge of extravagance was freely made. Owing to the expensive character of the line and rolling stock, and the Chinese likin tax system operating against any large freight traffic, it was maintained that it would take many years before the line could begin to pay its fixed interest charges. These conditions were fully set forth in the Special Issue of *The Far Eastern Review* of November 1909, on "*Railways in China*," and the history of the line to 1907 was fully given in the admirable Report of Mr. Collinson, the Engineer-in-chief. This report still stands as the only complete and technical exposition of the itemized cost of constructing railways in China, as no other engineer or railway director has permitted full publicity to these important details. In January 1907, a competent Foreign Traffic Manager was appointed, and from this date the open work of the line may be said to have started. The railway at that time was opened to traffic as far as Wusih or only 90 miles. The dates the various sections were opened to traffic, are as follows:—

Section	Date Opened to Traffic	Miles	Total Mileage
Woosung Line	9/10/1904	10.19	10.19
Shanghai-Nansiang.	20/11/1905	10.70	20.89
Nansiang-Soochow & Wusih.	18/7/1906	69.10	89.99
Wusih-Changchow.	15/5/1907	24.14	114.13
Changchow-Chinkiang.	15/10/1907	46.40	160.55
Chinkiang-Nanking.	1/4/1908	42.68	203.21

It is from this date then that the operation of the line should be studied, and although laboring under heavy handicaps the results obtained should form the basis of further comment.

During 1907 the working accounts were complicated by the existence side by side with the open working line, of a great amount of capital work for completion of the still unopened sections. Part of the cost of operation was thus debited to capital, and engineers and others who served both open line and construction draw salaries debitable to both heads. The Railway was still administered by the Board of Commissioners with a Foreign Chairman, and consisted of three Foreigners and two Chinese, one of the former being the Engineer-in-Chief, ex-officio. It was not till June, 1908 that the proper open line work began. The Administration was then altered. The Foreign Chairman and Board of Commissioners were superseded by a Chinese Managing Director, to whom was entrusted the duties of the Board but subject to its general appellate control. The Chinese Managing Director in turn was advised and supported by a General Manager, responsible for all the technical work and guidance of all the various technical heads of departments.

In June 1908 the undertaking began to bear all the working cost as a revenue earning project, and all charges to capital were practically closed. In other words the history of the Railway commenced from that period.

The results year by year from 1908 to 1912 are as follows:—

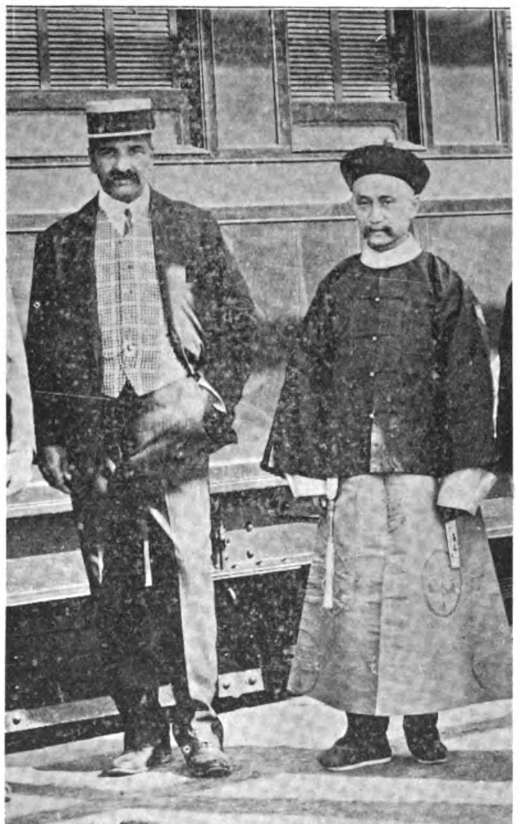
than last year. The working expenses will be 8% less than last year, and 6% less than the budget. The net revenue for the half year ending June, 1912, will show a greater increase than any whole year did before that time, and the line will almost pay its 5% guarantee in the fourth year of its open line work.

Year.	Gross Earnings				Working Expenses		Net Earnings $	Increase or Decrease $
	Passengers $	Goods $	Sundries $	Total $	$	% on G. E.		
1908	1,393,977	141,219	75,282	1,610,478	1,092,663	67.85	517,815	
1909	1,552,655	189,110	54,318	1,796,083	1,214,517	67.62	581,566	63,751
1910	1,766,827	207,889	43,633	2,018,349	1,390,678	68.00	627,671	46,105
1911	1,945,417	239,163	66,492	2,251,072	1,490,186	66.20	760,886	133,215
For ½-year ended June 1911	891,991	131,493	34,180	1,057,664	690,232	65.26	367,432	
For ½-year ended June 1912		152,874	26,568	1,407,000	821,000	58.4	586,000	(a). 205,429

(a) It will be noticed that the improvement for the *half*-year ended June 1912 is greater than that for any two of the previous *years* put together.

It will be seen from the table that the gross Revenue has increased yearly; the working expenses have steadily decreased in percentage on the gross Revenue, and the net Revenue has increased in the same proportion, till now, with the available figures up to July, 1912, the gross Revenue in 6 months is nearly $400,000 better

These figures are highly eloquent and speak for themselves. It will be noted that the increase is traceable to the passenger earnings, and the line is reversing the accepted theory that revenue must come from the freight or goods traffic. It is interesting to study the methods whereby such a result was secured.



A. W. U. Pope, C.I.E. — General Manager

Mr. Chung Mun-yew — Managing Director

E. J. Dunstan — Locomotive Superintendent

(Shanghai-Nanking Railway Officials)

(*Continued from page 107*)

foreigners. His task is one of great delicacy owing to the element which exists across the border at Chapei with apparently no other intent than to cause an open rupture of present relations.

When Mr. Pope assumed charge of the traffic department of the line, in January 1907, the passenger rates corresponded with those in force on other Chinese government lines, as follows:—

6 cents (Mex.) per mile		1st Class.
3 cents	„ „ „	2nd „
2 cents	„ „ „	3rd „

A careful study and analysis of the capital cost of construction of railways in other parts of the world, and especially in India, where conditions are similar to those in China, convinced the new Traffic Manager, that the rates charged by the Shanghai-Nanking Railway were unduly excessive and that no great increase in traffic could be hoped for unless the fares were reduced to the lowest possible point. The third class fares in England, where the average capital cost per mile is over £67,500 was 3½ cents (Mex.), and even in the United States the average 3rd class rate was about 2½ cents. The average capital cost of Indian Railways works out to about £9,100 per mile, and the average of the actual 3rd class fares charged was about ⅔ of a cent.

As the average capital cost per mile in China, conditions of living, scale of wages, quality of transportation and other railway characteristics were almost identical with India and taking into consideration that the Indian Railways had been built up under a fixed policy extending over a period of 26 years of low passenger rates (averaging ⅔ per cent per mile) producing an average net profit representing 5% on the capital invested, the Traffic Manager of the Shanghai-Nanking Railway line forcibly advocated a lowering of the rates then in force.

With the lowest passenger rate of nearly 2 cents a mile, the fare between Soochow and Shanghai (54 miles) was $1.05. The boat and launch service plying on the creek and canals between these two populous centers, carried passengers at 50 cents a head. This included two free meals, and a place to sleep, with the additional advantage of discharging the passenger in the center of the cities, instead of the outskirts. Under such conditions it was evidently absurd to expect them to travel by the Railway at more than twice the fare. To meet and overcome this severe competition it became imperative to lower the rates to at least one cent a mile, or forego any hope of building up a profitable railway passenger business.

As a result of Mr. Pope's recommendations the Board authorized a general modification of fares, which although not on a strictly mileage basis, worked out approximately to one cent a mile for 3rd class, two cents a mile, 2nd class, and four cents a mile for 1st class.

In other words the Board adopted the maximum 3rd class rate in India, as the minimum of the Shanghai-Nanking Line. The schedule of maximum and minimum passenger fares in India applicable to all railways, as fixed under Government Orders dated 16 July 1891, and modified Dec. 14th 1896, is as follows:—

	Maximum per mile.	Minimum per mile.
1st Class.	18 pies (6 cts.)	12 pies (4 cts.)
2nd „	9 „ (3 „)	6 „ (2 „)
	a little over	
Intermediate	4½ „ (1 ct.)	3 „ (1 „)
3rd Class.	3 „ (about 1 ct.)	1½ „ (½ „)

As a result of these rates, the passenger traffic in India has increased since 1892 from 127,000,000 to 371,000,000 in 1910, and the receipts from £5,163,000 to £11,413,600, an increase of 121 per cent in the same period. This policy which had operated to such good advantage in India when put into practice in China worked out along the same lines, and the increase in passenger traffic on the S. N. R. was immediately noticable. A comparison of earnings between Shanghai and Wusih in 1907 under the reduced rates, with the same period for the preceding year 1906, showed that in 1907, the number of passengers carried was 534,954 earning $196,168 as against 196,505 passengers in 1906 earning $105,551. Pending the abolition of the Likin Tax Charges which operate against any large increase in the goods traffic, it is only by the development of the passenger traffic at the lowest rates that the line can hope to pay, and the steady increase in this traffic as shown on the table forcibly testifies to the wisdom of the policy.

Table A

Year.	Imperial Railways of North China.			Shanghai-Nanking Railway.		
	Number of Passengers.	Average Mileage worked.	Average No. per mile worked.	Number of Passengers.	Average mileage worked.	Average No. per mile worked.
1905	3,137,754	561	5,563	Not open	—	—
1906	3,363,206	562	5,984	982,637	53	18,540
1907	3,276,202	572	5,728	1,843,450	115	16,030
1908	3,202.967	600	5,338	3,273,790	192	17,051
1909	3,603,303	603	5,976	3,538,701	203	17,432
(for 15 months)						
1910	3,239,158	603	5,372	4,488,952	203	22,109

The following gives the money values for the above:—

Year.	Imperial Railways of North China.			Shanghai-Nanking Railway.		
	Amount earned for Passengers.	Average mileage worked.	Ave. Receipts per mile worked.	Amount earned for Passengers.	Average mileage worked.	Ave. Receipts per mile worked.
	$		$	$		$
1905	5,136,771	564	9,108	Not open	—	—
1906	5,755,828	562	10,242	328,485	53	6,198
1907	5,046,139	572	8,822	763,938	115	6,643
1908	4,898,633	600	8,164	1,393,591	192	7,258
1909	6,043,573	603	10,023	1,552,258	203	7,647
(for 15 months)						
1910	5,141,402	603	8,526	1,766,338	203	8,701

It will be noticed that whereas on the Nothern Railways there was a distinct downward tendency for the four years ending 1909 (due allowance being made for the extra 3 months figures in that year) with an increasing mileage, the Shanghai-Nanking Railway shows a steady and marked upward tendency.

In view of the undoubted success of the low rate of 1 cent per mile, resulting in such a remarkable passenger development on the S.N. Railway it is interesting to compare the results with those secured on the Government Railways of North China. This line is also mortgaged to the British and Chinese Corporation, and under the terms of the loan, has a foreign Director, Engineer, Traffic Manager and other important officials.

This line holds an enviable position amongst railways, returning about 18 per cent profit in the capital invested. A third class rate of 2 cents per mile is charged on the Northen Railways. It has no water competition and enjoys the advantage of longer hauls. The published accounts of the Northern compared with the Shanghai-Nanking line show the following:—

(*See Table A*)

We have before us the published returns of the Peking-Hankow Line and a further comparison with the results of this Railway where the 3rd class fare is about 2 cents per mile, is also interesting and elucidating.

Year	Total number of passengers	Mileage worked	Average per mile
1906	1,418,037	787	1,802
1909	1,886,817	815	2,315
1910	2,165,837	815	2,657

The money values of the above are:—

	$		$
1906	2,459,906	787	3,126
1909	3,153,310	815	3,869
1910	3,688,131	815	4,525

It will be seen that the above compare very unfavourably even with the figures for the Imperial Railways of North-China and still more so with the figures for the Shanghai-Nanking Railway. The 3rd class fare is about 2 cents a mile (Peking to Hankow distance 752 miles, fare $15,00) and the figures quoted afford a striking comment upon the fact.

It is clearly evident that the rate policy laid down by Mr. Pope and wisely adopted by the Board, if left alone for a number of years must bring satisfactory results to the bondholders and the Chinese Government. The figures show that the Shanghai-Nanking Railway is now carrying more passengers per mile open, than any railway in India or China, and nearly as many per mile of line operated as some of the busiest metropolitan railways in the world. The earnings are steadily increasing, and the proportion of working expenses to gross earnings are decreasing with the result that for 1911 the line has practically paid 2½ per cent on the nominal value of the Loan Bonds or nearly half the interest charges, and at the present rate of increase it will cover the 5 per cent on its capital in the next working half year. Such a result considering the handicaps under which the line is operated is highly creditable to the management, and comes within the limits of sound railway principle as incorporated in the Indian Government Railway code. To be classed as productive work and sanctioned for construction by the Government, a railway in India must show good reason to believe that it will earn its guaranteed interest in 5 years after it has been constructed and open to public traffic. In India under a fixed sympathetic policy and close harmony between the government and railways, where the dominant idea is to smooth over difficulties and facilitate the development of the lines, this five year limit is a liberal one for the railway management.

If any credit is due to the management of a line in India, which pays its guaranteed interest in five years a much larger measure of praise is fairly due to any railway manager in China who in the same period reaches the desired goal, in the face of existing conditions.

In the management and operation of a railway in China, under a system which creates sinecures for the employment of a horde of hangers-on and political favorites, it is natural that the percentage of operating expenses would be much larger than if true economy was practised and the lines operated as a purely business proposition. The history of State owned and operated lines is the same in most parts of the world, as political influence is generally stronger than efficiency and merit in securing employment. This system has reached its limit in China, where two or more employees are found to do the work of one, and on some railways there are three station masters who stand around look wise, sport a uniform, draw the pay and pocket the squeeze while one man does the real work. And yet the lines pay.

On lines under the direct control of the Chinese Government such practices are their own concern and is nobody's business. Even on loan built lines, which are the property of the Chinese Government and the earnings mortgaged to the financing syndicates, the practice of overloading the pay roll with an excessive Chinese staff, is also a matter which concerns only themselves, provided the interest on the bonds is regularly paid. If the Chinese Government feels that it is necessary to employ a large Chinese staff to check the work of the foreign officials or educate its people in railway operation, and is willing to pay for this luxury and saddle the road with extra expense, or in other words if they wish to take their share of the profits by distributing it in patronage, and make up the deficiency in the interest on the bonds from other sources, it is still their own business.

The foreign managers of loan built roads contend that if they were freed from the excessive number of Chinese employed in sinecures, the profits of the lines would be greatly increased and the working expenses reduced to a percentage on gross earnings far below any other railways in the world. On the other hand the Chinese justify their position on the grounds that the lines are the property of the Chinese Government, and employment should be found for Chinese wherever possible. and that the foreign staff should be reduced to a minimum. They maintain that the loan agreements have saddled the lines with an excessive and expensive foreign staff which could be greatly reduced, and the work done by Chinese and the same results secured. If the Chinese selected honest and efficient men they would be amply justified in their stand, but until such time as they develop trained railway men, the foreign staff must be accepted if the roads are to be financed and constructed with foreign capital. In reviewing the work of a loan built railway in China, ample allowance must therefore be made for this attitude of the Chinese Government, and its bearing on the financial results, which in turn reflect on the efficiency of the foreign management of the enterprise.

It is natural that both foreigners and Chinese should strive for increased pay, and that both sides would advocate the cutting down of the others salaries to increase their own. Hence a source of continual friction and dispute.

But granting that either side is justified in their stand, the fact remains that a great cut could be made in salary lists without injury to the railways, a reduction that would instantly be made, if the foreigner had full sway, or if the lines were operated by a private company, where profits were the first concern. As it is now, the operating expenses are unduly increased, and in the case of the Shanghai-Nanking Railway, delaying the time when the bondholders can secure a percentage of the profits under the terms of the loan agreement, and the Chinese Government is saddled with an nunecessary drain on its treasury. The Chinese on their part also advance the argument that the foreign staff is overloaded and that by practicing economy at this end a similar saving could be made, by reducing their salaries or employing Chinese in their stead. This situation is an interesting side light on the cost of operating a loan built railway in China. It is quite clear however by admitting the justice of either side of the argument, that the operating cost of the Shanghai-Nanking Railway, could readily be reduced to a figure representing 50 per cent or less on the Gross Earnings without in the least impairing the efficiency of the line.

Aside from the gratifying results shown in the financial returns, the line has passed through a trying ordeal during the Revolution which taxed its limited carrying capacity to the utmost. The line was ill prepared to meet the urgent demands on its service by the revolutionary leaders for the transportation of troops to attack Nanking. The railway was barely equipped and manned for operating the regular daily service, and no provision had been made for running trains at night. By utilizing the road during the day for the usual passenger traffic, which was greatly augmented by the wholesale exodus of families from towns along the line seeking the safe precincts of Shanghai, and employing the same rolling stock at night for the transportation of troops and supplies to the front at Chinkiang and beyond, the line was able to fulfil all demands made on it by the public and the army.

The revolutionary leaders have freely admitted that their success in capturing Nanking was greatly facilitated by the able management of the railway during the crisis, thus enabling them to concentrate the army at the front without loss of time. So it may be fairly said that the management of the Shanghai-Nanking Railway has earned a place for itself which entitles it to all credit for the remarkable financial showing made, and praise for the skilful manner in which it was operated when put to the severest test that can be imposed on a railway.

The success of the line is largely due to the efficiency of the Managing Director, Mr. Chung Mun-yew, one of the ablest officials of China. His intelligent grasp of railway matters, and cordial co-operation with the foreign General Manager, Mr. Pope, has made possible the excellent record above outlined.

A SIDELIGHT ON CHINESE CONTROL OF JOINT-STOCK COMPANIES

CHINA MERCHANTS' STEAM NAVIGATION CO.

The cancer of corruption which has played such disastrous havoc with so many industrial enterprises under the management of Chinese has now brought the China Merchants' Steam Navigation Company to the verge of ruin. This, and the Han Yeh Ping Corporation (the Hanyang ironworks, Ta Yeh iron mine and Ping Hsiang Colliery Co.) are the largest Chinese managed concerns in the country, and both are in financial difficulties. The C.M.S.N. Co. is the only existing Chinese shipping enterprise of any magnitude exclusively controlled by Chinese, and the deplorable state of its affairs has been brought to public notice by the laudable efforts of a new Board of Directors to institute reforms, and the strenuous labors of the company's employees to baulk any measure destined to change the old order under which they lived and grew financially fat at the expense of shareholders. Men well-known in China and the world like Wu Ting-fang and Wen Tsung-yao have been compelled, as Directors of the company, to publicly denounce the insidious corruption marking the working of the business, and the pother occasioned by the attempts to introduce reform has been so keen and has brought the concern so much into the public eye that it is interesting to trace its history and outline the steps which have led to the unpleasant and impossible situation in which the Directors and the shareholders find themselves to-day.

The Company owed its origin to the activities of two expectant Taotais of Tientsin in the latter part of the reign of Tungchih about 1872. They were Sheng Hsuan-huai (whose railway nationalisation policy of 1911 may be said to have precipitated the recent revolution) and Chu Yuen-fu. Being of a commercial turn of mind, these men evolved the idea that the transportation of the tribute rice then being carried by junks on the Grand Canal from the Southern provinces might be profitably done by steamers, and receiving a favorable reply to a memorial on the subject sent by them to Li Hung-chang, then Viceroy of Chihli, they chartered two steamers, and commenced the work. It was not profitable. Expenses were so heavy that they were compelled to cast about for a means of averting further loss, and they endeavored to form a company. An appeal to merchants for funds met with no response, and even the solicitations of Tang King Shing—who was then compradore of Messrs. Jardine, Matheson & Co., and who was held in high esteem by both Chinese and foreigners, failed to produce material assistance for some time. Eventually, however, he enlisted the sympathies of a Cantonese tea and silk merchant, Hsu Yu-chih. In 1877 they negotiated with Russell & Co., managers of the Shanghai Steam Navigation Company, for the purchase of that company's fleet, and with a definite proposition to offer they were able to secure the support of the Nanking Viceroy, and, as a result, the Imperial Government contributed Tls. 2,000,000 with which to effect the purchase of the 17 vessels and the landed property, wharves, etc., of the S. S. N. Company. Thus the China Merchants S. N. Company became semi-official, though the officials dropped out when subsequent operations brought losses, the Tls. 2,000,000 being deducted in instalments from the amount due by the government for freight on rice, though the Government retained its representatives on the Directorate.

Keen competition by Jardine, Matheson & Co., and Butterfield & Swire, brought continued losses instead of profits, and a conference led to a 10-year agreement to sustain uniform freight and passage rates, the agreement being renewed at the expiration of the period. It obtained, in fact, until the Franco-Chinese war, when the C. M. S. N. Co., decided to sell their vessels and property to avoid loss by seizure. Russell & Co. became the purchasers, the price paid being Tls. 5,000,000. The Censors in Peking did not fail to make a note of this transaction, and upon the conclusion of the war they impeached Ma Mei-su, the general manager who effected the sale, for disposing of the company to foreigners. Shen Hsuan-huai and Hsu Yu-chih consequently brought their influence to bear to recover the property from Russell & Co., but only succeeded in doing so after agreeing that all arms and ammunition required by the Government should be bought through Russell's house. The purchase price was the same as that paid, Tls. 5,000,000.

Rate cutting by the opposition firms again caused the Company heavy losses until the agreement for uniform rates was renewed, and Ma Mei-su was removed from the managership. Shen Hsuan-huai then stepped into the vacancy and became Director-general, and from that time (1885) the property began to rise in value. In 1892 the Company bought the godowns at Pootung (Shanghai), and the present offices in

Foochow Road, Shanghai. Until 1904 prosperity was enjoyed by the shareholders, but since then returns have been disappointing. The Shareholders agitated for reforms, but their demands were unheeded until four years ago, when a concession was made in the shape of the appointment of a Board of Directors ostensibly to take the control from the hands of the mandarins and employees. For the first three years the Directorate was one in name only, owing to the dominance of the three officials sent by the Board of Communications at Peking, and they maintained control until last year, when the fall of the Manchu *régimé* also brought about the fall of their officials. The independent directors, at the instance of Wen Tsung Yao then compelled the officials to resign, nor would they tolerate any other appointees from the government when the provisional Republican Government attempted to follow the practice of the previous Government, rightfully maintaining that the Government had not the least ground upon which to seek representation in a company in which they did not hold one share. Thus this year, for the first time in the history of the Company, the

WEN TSUNG-YAO

Directors appointed by the shareholders, began to have power—and assert it.

The original capital of the company was Tls. 800,000 subscribed by the founders and their friends; it was later increased to Tls. 2,000,000, and owing to the subsequent wave of prosperity, the capital was doubled by the gift to shareholders of two shares for every one share held by them, bringing it nominally to Tls. 4,000,000—40,000 shares. The largest shareholder was Sheng Hsuan-huai, who held 12,000 out of the 40,000 shares, purchasing most of them during the slump following the Franco-Chinese war. Naturally, he was for a long time a dominant figure in the Company, and when the Board of nine Directors settled down to business three of them at least soon declared themselves, and the Board spilt up into groups. The Chairman was Wu Ting-fang, and he and Wen Tsung-yao and Chen Ko-yang, all Cantonese, supported the reform campaign, whilst three Chekiang men, Wang Chung-shan, Sze Tse-ying, and Chao Ching-pao, elected by the influence of Sheng Hsuan-huai were opponents to some measures, Li Shu-yun and Yang Shih-chi, Anhui men, and Chang Chung-chao, from Chihli, being in a sense neutral. The reformers, however, were determined to do something to put the Company on its feet—for Tls. 680,000 had been lost in 1911, and Tls. 100,000 per month were being lost during this year. They discovered that corruption was rampant and that shareholders were suffering chiefly because the earnings of the Company were being diverted in large measure to the pockets of employees. In all, three proposals were eventually brought forward for consideration. Wen Tsung-yao proposed the first one—to employ a foreign manger and a compradore and reform on the lines adopted by foreign companies—urging that since the C.M.S.N. Co. held the best wharfage in the treaty ports and was a Chinese company there must be something radically wrong with the management if they lost money whilst foreign companies gained it. With the proposal Wu Ting-fang and Chen Ko-yang agreed, but the other six opposed it, pleading the extraordinary excuse that sovereign rights would be lost and that anyway, it would be a disgrace for Chinese to have to follow in the footsteps of foreigners after so many years.

Wu Ting-fang in an effort to meet their wishes then made a second proposal that the Company be leased for 10 years to a syndicate of Chinese for Tls. 400,000 per annum, or 10% of the capital value. If during 10 years the lessees

SHÊNG HSÜAN-HUAI

made money, argued Dr. Wu, they would be willing to put capital into the Company to retain an interest, and with the additional capital the Company could inaugurate a service to Europe, America, and elsewhere. Meantime the lessees would clean out the Augean stables. If, on the other hand, they could not succeed, the business could be wound up. The other six directors still opposed, and the Chekiang men then came forward with the third proposal that the Company should be reorganised by introducing new capital, if necessary, from outside Chinese, the suggestion finding favor with six directors, the three Cantonese being against it.

The opposition to this scheme was due to the certainty in the minds of the opponents that it was a bogus plan devised by Sheng Hsuan-huai to delude shareholders and Directors, and to enable Sheng to gain control of the Company without reforming it in any way. The Cantonese desired the introduction of actual capital to secure a thorough overhaul, but the third scheme was based, not upon the introduction of cash, but a manipulation of the shares. Another ulterior object of this third scheme was to abolish the Board of Directors and establish a Director-General and an Assistant Director-General in its place. The three proposals were, however, placed before shareholders one month before the general meeting which was held on July 14 to consider them. The vote then taken showed that only 47 voted to reform under European management, 6,655 voted to lease the property, whilst 17,482 voted in favor of reorganisation.

The opposition of the Cantonese to reorganisation was acute and Sheng Hsuan-huai's agents suggested as a means of getting rid of the objectors—that all shares held by Cantonese (a total of 10,000) should be bought in at Tls. 150 each, and to raise part of the necessary amount the Hongkew godowns should be sold to a Japanese firm who was offering Tls. 1,400,000. To shareholders from other provinces the proposal was made that for the shares they held they would be given an extra share—or that the script with a face value of Tls. 100 should be destroyed and new scrip with a face value of Tls. 200 issued.

On July 23 a meeting was held in the house of Sheng Hsuan-huai, in Bubbling Well Road, Shanghai, when some of the six directors partial to his plans attended. The whole scheme was discussed, and it was then disclosed that Yang Shih-chi, a friend of Yuan Shih Kai, was to be appointed Director-General in order that the affairs of Sheng, against whom Yuan Shih Kai entertains a bitter grudge, might be made to

WU TING-FANG

run smoothly. The sub-Directorship was to be given to Wang Chung-shan. Two of the six directors did not, however, see eye to eye with this scheme, and after the meeting visited the Cantonese directors and laid the matter bare, complaining that they wished to join in with the Cantonese since the latter were to get Tls. 150 each for their shares, whilst it looked as if the balance would get nothing, but paper, which would undoubtedly depreciate in value until Sheng could purchase all he wanted in order to obtain complete control. They expressed the wish to co-operate against Sheng, declaring that not only Cantonese, but all shares should be paid for in cash, and thus the opposition to Sheng Hsuan-huai scheme was strengthened.

Following the decision of the meeting of shareholders, however, advertisements were placed in the Chinese press calling for capitalists with Tls. 6,000,000 to reorganise the Company, Liu Hsueh-hsun, a Cantonese, came forward as the representative of a Chinese syndicate and offered payment of the required Tls. 6,000,000, and Tls. 3,500,000 to pay off the Company's

debts, as soon as an agreement could be signed. Sheng's agent, Wang Chin-shan, became alarmed at the appearance of a definite offer of this character, and in order to gain time declared that he could secure Tls. 8,000,000, in addition to the Tls. 3,500,000 to pay off the company's liabilities, from capitalists who were willing to take over the Company. Wang, in reply to a question, said he could not name his capitalist, and, as he was abroad, he could not attend a meeting next day, whereupon Liu claimed that he should have an option since he came forward with a definite offer in reply to the advertisement. As Wang had offered Tls. 8,000,000, plus the amount to pay off the liabilities, he would like a week in which to confer with his syndicate to see if they would increase their offer. The week was granted, and at the expiration of the period Liu expressed the readiness of his financial friends to equal the offer of Wang.

On the same day that Liu appeared with this information Tang Shao-yi's sixth brother, Tang Yen-lu (one time connected with the C. M. S. N. Co's Hongkew wharf) represented Wang with the Tls. 11,500,000 proposal, but his offer was put out of court by the Directors because he said that no present shareholders would be permitted to take up shares in the reorganised company, and because he desired three weeks in which to bring forward the capitalists, whereas Liu declared that his capitalists would welcome shareholders, because they desired to extend the business by inaugurating ocean lines. Liu being the only one left in the running nothing apparently remained to be done but sign an agreement and so conclude the desires of the majority of the shareholders in regular meeting assembled.

To determine upon a proper agreement a committee of three (Wu Ting Fang, Wang Chen Shan, and Chang Chung Chao) was formed from the Directorate to negotiate with Liu, and the meetings were to be held in Wu Ting Fang's house, but before their labors could be concluded an unexpected element in the shape of the employees interjected itself into the question, and brought about a dramatic anti-climax.

Headed by Messrs. Chen Fei-ting, Tang Fung-chih, and Shi Su-shang, the three managers of the Company, the employees commenced a hostile opposition, publishing wild statements in the press against the Directors for selling the Company to foreigners, and particularly defaming the agent Liu in unmeasured terms as a scoundrel and worse. The managers wired to President Yuan Shih-Kai, and members of the Cabinet, raising the alarm that China was to be sold lock, stock, and barrel to foreigners through the agency of Liu, and just as hot-foot came back telegrams from the President and others forbidding the sale, though upon what grounds the Government could claim to prevent a private company from doing what it liked with itself was not explained. Mr. Ivan Chen, the Commissioner of Foreign Affairs, was instructed to investigate and prevent the sale, but he quickly found that there was no ground for the allegations of the employees that the Directors were selling out to foreigners.

The newspapers wrathfully declared that an agreement had been signed, and so greatly did the agitators play upon the popular mind that largely attended meetings of people having no interest or concern in the Company were held to instruct the Directors what they should and should not do. Only in China could such a thing happen.

Two meetings between the committee and Liu had been held when this storm broke loose, and at the third meeting Mr. Wen Tsung Yao attended to personally ascertain just how the negotiations were going. Whilst Liu would not, in response to popular clamor, give out the names of his financial friends, he, at this meeting announced that they were rich Chinese whose names could not be given, since the anger of the populace would at once be directed towards them instead of him, but the capitalists would, he promised, be presented to the Directors before the agreement was signed. As a matter of safeguard, however, Wu Ting Fang proposed that 10% of the purchase price should be paid in, and, if it were found upon signing the agreement, that foreigners were interested' this amount should be forfeited and the negotiations declared off. Not content with that, Wen Tsung Yao urged that the whole sum of Tls. 8,000,000 should be forfeited if foreigners were interested, and Liu ultimately agreed to that. This was on August 2.

On Sunday August 4, the three managers of the C. M. S. N. Co. (Chen, Tang, and Shih) sent a letter to the Directors inviting them to attend at the Board-room at 5 p.m. next day to hear the claims of the employees to a bonus totalling Tls. 970,000. Wishing to have a further conference with Liu in regard to the conditions of the agreement Directors attended at the office at 3 p.m. About 4 p.m. after Liu left, the question of the bonus raised by the three managers was opened for discussion, and since the proposal was that 10% of the reserve fund (which includes Tls. 4,000,000 capital) should be deducted to cover a period of 40 years, and be distributed among the employees, the Directors unanimously and unhesitatingly refused, their refusal being accompanied by a statement that not only were the present employees not entitled to such a sum, since they already enjoyed a regular annual bonus, but they had no claim to money which, if it could be distributed as a bonus, partly belonged to employees who were long ago dead or who had severed their connection with the Company. On no grounds, however, would the preposterous demand be entertained, but the Directors did not expect the little scheme of coercion that had carefully been hatched for their benefit in anticipation of this very attitude.

During the discussion with the managers the door of the room had been locked from the outside, but scarcely had their refusal been definitely understood than it was opened, and about one hundred Chinese rushed into the room and commenced an excited demand for the bonus. The door was closed and guarded; no one was allowed to go out, and the six directors in attendance were at the mercy of a serious-eyed collection of determined men. Scenting trouble, Wen Tsung-yao went to the telephone to call the police, but the general in command of the besieging force, whoever he might have been, had carefully cut the telephone wire, and so the attempt to obtain assistance from the outside was thus far frustrated. The crowd demanded to know why Wen Tsung-yao wished to call the police, and, alleging that it was to have them arrested, commenced to attack him. An ink well aimed at his head touched him in passing and tilted its contents over his silk gown, the window was broken, and a general melee seemed imminent, especially as anything but gentle blows were being struck. Director Li Shu-yun deemed discretion to be the better part of valor and escaped by the window, being shortly afterwards followed through the same exit by Chen.

Four Directors remained to face the crowd, who were now quietening, and as soon as words could be heard the spokesman of the intruders announced that the Directors would have to agree to sign a document approving the bonus asked for before they left the room, and two or three of the employees drew up a document to this effect. They insisted that the Directors should sign. Wu Ting-fang was the first to append his name, and did so declaring that as it was under compulsion it was valueless, and Wang Chung-shan followed, with Chang Chung-chao third.

As this was not a sufficient number to make the document binding upon the rest of the Directors, the spokesmen endeavoured to insist upon Wen Tsung-yao signing. He refused. They threatened, and the more they threatened the more insistent he became in refusing. His fellow-directors beseeched him to sign in order to avert danger, but Wen was obdurate.

"It is shareholders' money they want—and I won't sign that away even if they produce a bomb to kill me," said Wen Tsung-yao quietly. The crowd looked ominous towards 7 p.m., but any violence they might have felt disposed to use was checked by the announcement that police were trying to get in the building—the alarm having been given by a messenger. The courage of Wen Tsung-yao won the day, for by 7.30 p.m. the employees determined that it would be wiser to withdraw since the police were hammering at the door. Wu Ting-fang, Wang and Chang were allowed to escape first, but the crowd would not let Wen Tsung-yao go until they had expended a little more effort upon him though it proved to be of no avail, Wen Tsung-yao convincing them that if it were right for him to sign he would do so without violence, but no violence would compel him to sign when he knew it was wrong for him to do so.

At once the employees commenced a campaign of vituperation, and in the newspapers charged the Directors with having received Tls. 800,000 bargain money from Liu, and having signed the agreement to hand the Company over to Japanese. Despite the fact that Ivan Chen's investigations disproved all these allegations, and that the committee appointed by an indignation meeting likewise had all documents disclosed to them, the campaign was still carried on and another indignation meeting was held at the Y.M.C.A. rooms, at which Wu Ting Fang was again forced to sign his name, this time agreeing to head an association to prevent the sale of the Company to foreigners. The Press agents of the opposition announced that the leading political associations were represented in the new association to preserve the Company, and published the statement that Wu Ting Fang admitted the sale and had apologised at the meeting. This of course was an untruth, and was next day repudiated by Wu Ting Fang, whilst the political associations also published advertisements repudiating the statement that they were connected with the new association.

At the second meeting of the association Wu Ting Fang refused to attend, and as a result he was roundly condemned and warmly denounced, Mr. Fu, the auditor of the C. M. S. N. Co., being appointed President in his place. Invitations were sent out to shareholders to register as members of the "Upholding Association"—as the rendering of the Chinese character show it to be—but no more than the holders of 2,000 shares could be collected. The efforts on the part of the various agitators failed to inspire the Board of Directors to resign as a body, though Wu Ting Fang decided to permit the Company to look after itself, so far as he was concerned, and sent in his resignation. He and Wen Tsung-yao had borne the burden of running the early part of the Revolution but they found it easier to turn the Manchus out than reform the C. M. S. N. Co., with which pathetic and significant confession Dr. Wu retired into private life once again.

In the meantime the much abused Liu, under the constant fire of public criticism, and even official condemnation from Peking, disclosed the names of his principals, and showed them to be well-known men of old official rank and some Manchus—and not, as alleged, Japanese.

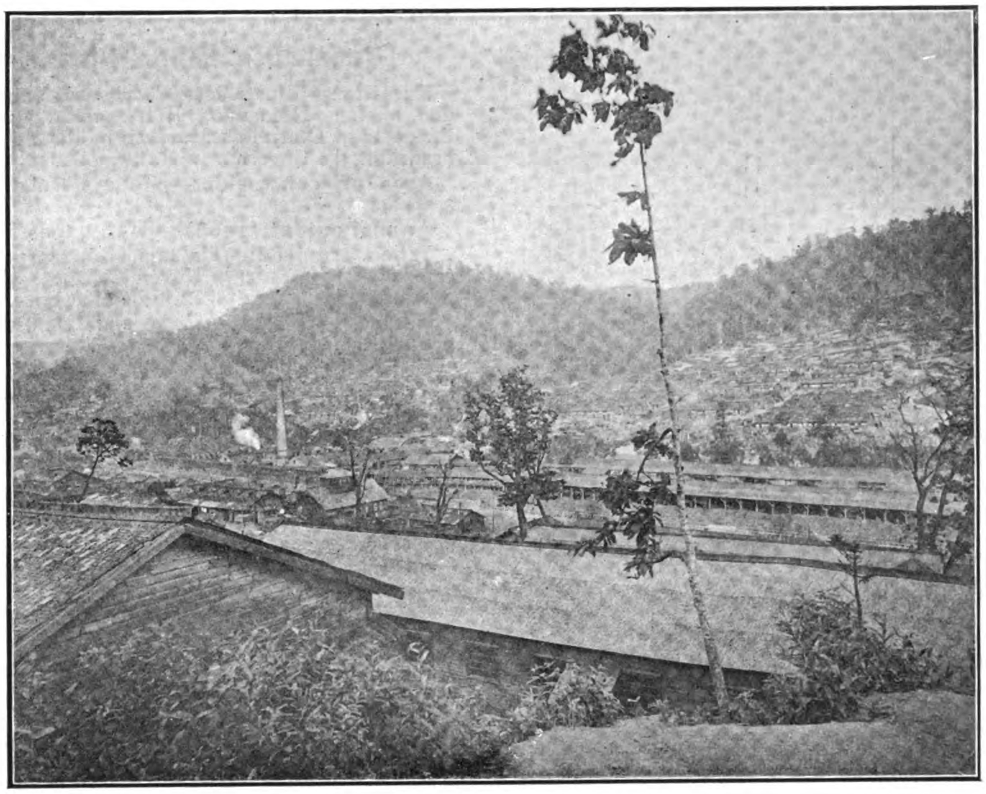
The obstruction raised by the employees consequently collapsed to a great extent, and the prospective "reorganisers" are themselves carrying the matter to Peking, where a delegation has gone on their behalf to argue their case with the Government. Thus the matter stands at present.

It is a strange commentary on the state of company management in China, that employees and disinterested parties are able to prevent Directors carrying out the expressed wishes of shareholders, and be able to obstruct reform so that the corruption they have almost made legal by usage should continue to be possible.

The fleet of the C. M. S. N. Co. at present consists of 31 steamers, with an aggregate of 59,332 tons and 39,700 horse-power. The Company have also a number of tugs and lighters at Tientsin and Kiukiang. At a rough estimate their properties are worth, altogether, fully Tls. 25,000,000—Tls. 13,000,000 being counted as the value of their land, and Tls. 12,000,000 as the value of the steamers. The headquarters of the Company have always been in Shanghai, but there are also wharves and various interests of the Company at Chungking, Ichang, Hankow, Kiukiang, Chekiang, Wuhu, Nanking, Ningpo, Wenchow, Amoy, Swatow, Foochow, Canton, Hongkong, Chefoo, Newchwang and Tientsin.

THE MINES OF THE ORIENT

PROPERTIES OF THE HOKKAIDO TANKO KISEN KABUSHIKI KAISHA (HOKKAIDO COLLIERY AND STEAMSHIP COMPANY)



VIEW OF YUBARI NO. I. MINE

This Company (whose head office is in Muroran, Hokkaido), was established in November, 1889, and was first engaged in the business of coal mining and railway transportation. With the progress of the work of opening up Hokkaido, the demand for its coal increased, and the company extended its railway and enlarged its colliery works, opening new mines, besides improving its equipments and steadily developing its business. Orginally the company's capital was 6,500,000 *yen;* but in October, 1906, it was increased to 27,000,000 *yen,* while it issued debentures to the extent of 10,000,000 *yen,* which was raised in London. About that time the Imperial Government adopted the policy of nationalising the principal railways of the country, and the company's lines came to be purchased at the price of 30,997,100 *yen,* which the Government paid in Railway Bonds. Of the company's loan the Government of the same time took over the obligation to the extent of 4,000,000 *yen.*

The company, then, proceeded with disposing of the bonds, distributing a half of the amount among its shareholders and employing the remaining half in enlarging its colliery works, shipping service, the manufacture of coke and forestry business, together with establishing an iron foundry at the port of Muroran. Further, in conjunction with two of the foremost companies of England, the company opened in the central part of the port a steel works called the Japan Steel Works (Kabushiki Kaisha Nihon Seiko Sho). Thus, in spite of the nationalisation of its railway, the company in no way suffered in its capital, its total shares at present being represented by the sum of 27,000,000 *yen* of which 4,500,000 is still unpaid. Its outstanding debentures are 6,000,000 *yen.*

The products of the company's collieries are well known, being among the best coals produced in Japan, Though the annual output does not exceed 1,500,000 tons at present, it is expected that the figure will reach 2,000,000 tons in a few years. The company's forestry and lumber businesses are not many years old yet, but their outputs are already being sent abroad. Its iron and steel works are still in their initial stages; but the company expects to shortly put on the market the products from their furnaces.

The different lines of business the company is engaged in at present are as follow:—

1. Colliery business.
2. Manufacturing of cokes.
3. Manufacturing of iron, steel and machineries.
4. The company possesses the right to work iron mines and collect iron sands and also dig for other minerals necessary for the production of iron and steel.
5. Electric light business.
6. Manufacturing gas.
7. Forestry and lumber mill business.
8. Shipping business.

A general idea of the nature and conduct of the company's business, may be obtained from a perusal of the following notes:

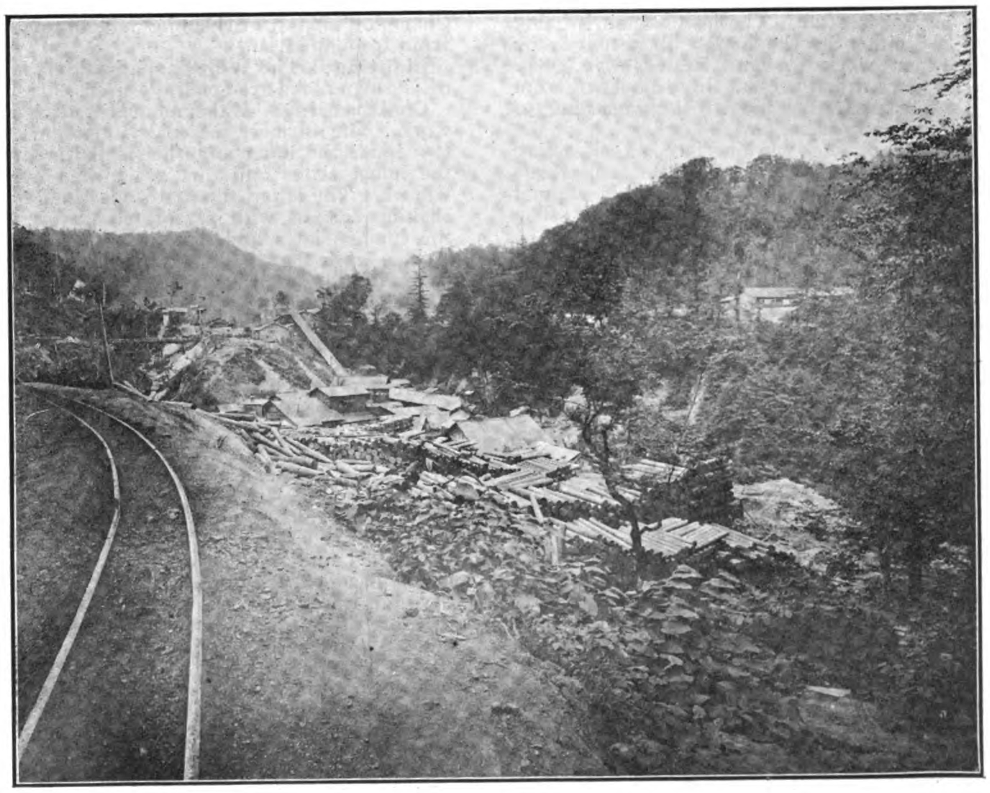
Yubari Coal Mine. No. 1.

The Yubari Mine, No. 1, is situated at Noborikawa, Yubari-gun, Ishikari, Hokkaido, having connections with the ports of Otaru and Muroran, via the branches of the Government Railway. The Manji Mine, situated about four miles to the north of No. 1 Yubari Mine, with coal seams continuous with those of Yubari Mine. It is about 14 miles due east of Shibun station, along the river Horomui.

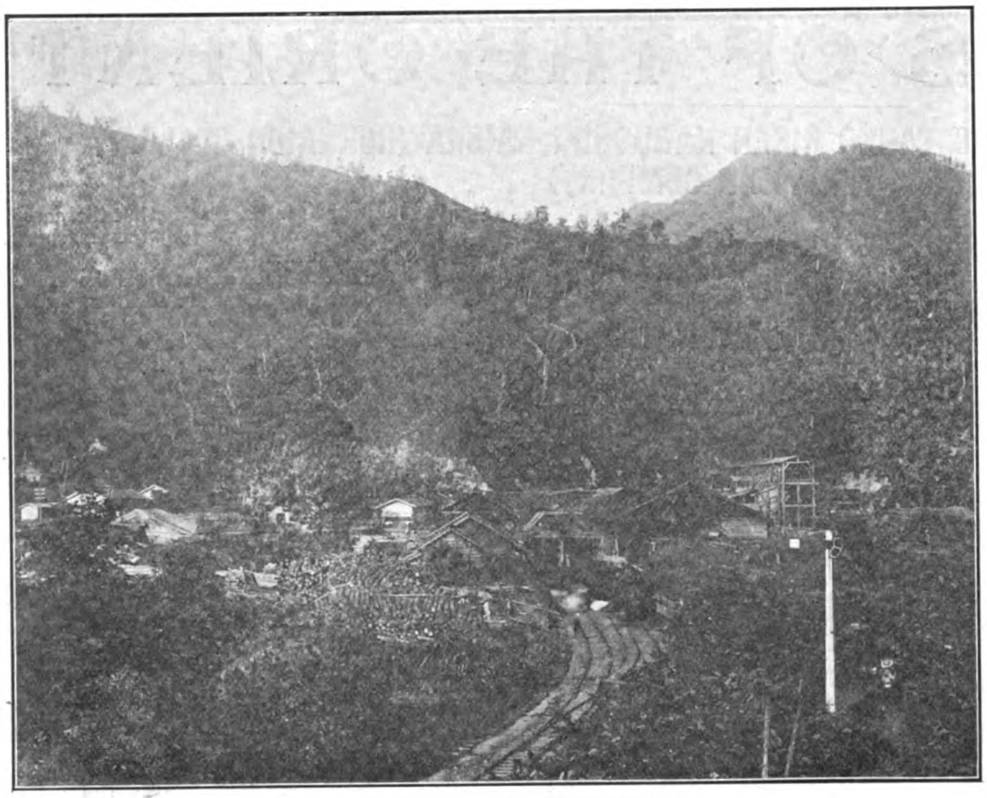
The area of the Concession is 11,212,623 *tsubo,* or about 9,161 acres.

Annual output (1908):—About 500,000 tons.

When discovered:—Yubari Mine No. 1, was discovered 24 years ago, in 1888, and two years later this company obtained official permission to work it, and forthwith commenced operations. Manji Mine originally belonged to Eiji Asabuki, and came into this company's possession in January 20, 1903. The company commenced operations in the mine in November, 1905, and after more preliminary arrangements began to put its production on the market from July, 1909.



VIEW OF YUBARI NO. 2. MINE



VIEW OF IKUSHUMBETSU MINE

Geology:—Tertiary shale and sandstone dipping north-east from 10 to 30 degrees.

Coal seams:—Workable seams are two, at Yubari Mine No. 1 the upper seam is 24 ft. thick and the lower 4 ft. Both seams are now being worked. At Manji Mine the upper seam is 4 ft. thick and the lower 7 ft. The lower seam alone is being worked for the present.

Quality of coal:—Bituminous caking coal, sp. gr. 1,223, moisture 1,120%, volatile matter 46.588%, fixed carbon 49.585%, ash 2.440%, sulphur 0.267%. When coked, fixed carbon 95.063%, ash 4.678%. and sulphur 0.259% caking and the colour of ash light brown.

Mining:—Worked by the combination of board and pillar system with long wall retarding in the upper seam. The lower seam is being worked either by the long wall system or by the pillar work system. Besides five entry levels there are at present three slopes of from 1,000 to 2,000 ft. A shaft 18 ft. across and 550 ft. deep is now being bored.

Haulage:—Each working face has self-acting inclined plane to lower the coal to main roadway, Underground haulage is done by manual labour, horse and pneumatic locomotives. The locomotive has a pair of cyclinders 6 ins. dia., by 10 ins. stroke and is driven by 800 lbs. per sq. in., compressed air. It has an air-reservoir of 68 cu. ft. capacity. The coal at Manji Mine is transported to No. 1 Yubari Mine by the patent "Tamamura" system, double ropeway. The particulars are as follows:—Length: 6,500 metres; Difference between the levels of the terminals: 91 metres; Difference between the hightest and lowest points in the line: 443 metres; Carrying capacity per ten hour day: ascending load 500 tons coal, descending load 100 tons timber; Maximum weight or size of freight unit: coal 5/8 ton, timber 3 metres—when two cars are coupled timbers 20 metres long may be carried; Distance between consecutive cars: 82 metres; Speed: 109 metres per minute; Motive power required: 200 horsepower (electricity); Size of ropes:—Track rope 41.5 mm. dia. at loaded line, 35 mm. dia. at empty line, and hauling rope 28 mm. dia.; Number of supports: 51; Maximum span between supports: 337 metres.

Winding:—Three winding engines placed one each above the mouths of slopes: One endless rope hauling machinery driven by steam engine of 200 H.P.; One endless rope hauling machinery driven by induction motor of 135 H.P.; One steam direct hauling engine of 300 H.P.

Pumping:—Eight pumps placed in the first and second slopes, six Cornish double acting ram pumps placed at No. 1 slope of which three are a spare. Their st. cyl. each 18 ins. dia., plunger 12 ins. dia., each 24 ins. str., driven by 80 lbs, per sq. in. compressed air. At No. 2 slope, two Knowle's special duplex plunger pumps placed, one of them as a spare. Their st. cyl. 16 ins. dia., plunger 7 ins. dia., each 12 ins. str., driven by 60 lbs. per sq. in. compressed air.

Ventilation:—The mines being very fiery, two 20 ft. Guibal's fans and ten Champion's fans of from 4 to 8 ft. are used. The Champion's fans are driven by induction motors from 10 to 50 H.P.

Lighting:—The Wolf's naphtha safety lamps of German make are generally used.

Coal dressing:—Either manual or mechanical work. The former, the coal is classified into two kinds the lump and the small, then from the lump, slates and dirt are picked out by women. The latter, the coal is classified by the shaking screens with perforated plates, from the lumps, slates and dirt are picked out by women while they are travelling on the picking band, and the small is washed by "Elliot" and "Blacket" washers and jiggers.

Transportation at surface:—The mines are connected with the shipping ports of Otaru and Muroran by the Government Railway.

Number of workmen:—Underground 3,161; Surface 2,382; Total 5,543.

Motive power:—Steam; fourteen 24 ft. long by 6 ft. 6 ins. dia., Lancashire boilers, working pressure 80 lbs., and six 200 commercial H.P. Heine safety boilers, working pressure 125 lbs Compressed air. One duplex high pressure Corliss valve piston inlet air compressor of 20 ins. st. cyl. and 22-1/4 ins. air cyl. with 42 ins. stroke has a capacity of 2,718 cu. ft. of free air per min. raised to 80 lbs. press; Two air compressors of the same pattern of 24 ins. st. cyl. and 24-1/4 ins. air cyl. with 42 ins. stoke, each having a capacity of 3,211 cu. ft. of free air per min. raised to 80 lbs. press. One three stage air compressor of st. cyl. 22 ins. dia. by 30 ins. stroke, intake air cyl. 18 ins. dia. by 30 ins. stroke, intermediate air cyl. 18 ins. dia. by 30 ins. stroke and high pressure air cyl. 5 ins. dia. by 30 ins. stroke, has a capacity 560 cu. ft. of free air per min. raised to 800 lbs. press.

Electricity:—Three 300 K.W. 550 volts, 3-phases 50 cycles engine type generators, driven by 15"×32"×30" horizontal cross compound side crank condensing engines. These generators are usually run in parallel.

Exportation to foreign countries:—Amounts of exportation and their destinations during 1908 as follows:—Hongkong, tons 12,190; Vladivostock, tons 1,000; Singapore, tons 24,800; Savan, tons 9,510; Java, tons 3,696; Total, tons 51,276.

Yubari Coal Mine. No. 2.

Locality:—Situated at Noborikawa, Yubari-gun, Ishikari, Hokkaido. It is connected with the ports of Otaru and Muroran by the Yubari branch of the Government Railway.

Area of concession:—4,191,253 tsubo or 3,424 acres.

Annual output (1908):—117,650 tons.

When acquired:—The mine came into the company's possession in November, 1905, when operations in it were taken in hand at once.

Geology:—Tertiary shale and sandstone dipping east, from 20 to 70 degrees.

Coal seams:—Eight workable seams of from 4 ft. to 10 ft. No. 1 seam, is, however, about 60 ft. thick.

Quality of coal:—Bituminous caking coal, sp. gr. 1.227, moisture 1.590%, volatile matter, 43.575%, fixed carbon 53.535%, ash 1.110%, sulphur 0.190%. When coked, fixed carbon 97.768%, ash 2.027%, sulphur 0.205%, caking and ashy in colour.

Mining:—Worked by pillar working system along slopes of from 14 ft. to 18 ft. broad. At present there are eight levels and two slopes.

Haulage:—Each working face has self-acting inclined plane to lower the coal to main roadway. Underground haulage is done by manual labour or by horse. The coal taken at Mayachi mine is transported to Kayede Mine by the patent "Tamamura" system double ropeway. The particulars are as follow:—Length:—4,550 metres; Difference between the levels of the terminals:—50 metres; Difference between the highest and lowest points in the line:—218 metres; Carrying capacity per ten hour day:—Coal 500 tons descending loads, timber 100 tons ascending loads; Maximum weight or size of freight units:—Coal 5/8 ton, timber 3 metres in length. When two cars are used 20 metres or more allowed; Distance between consecutive cars:—82 metres; Speed:—109 metres per minute; Motive power:—100 H.P.; Size of ropes:—Track rope 41 mm. dia. at loaded line, 35 mm. dia. at empty line, and hauling rope 25 mm. dia.; Number of supports:—33; Maximum span between the supports:—647 metres.

Winding:—Four winding engines placed one each above the mouths of slopes, driven by induction motor of 50 H.P.

Pumps:—Only one Worthington special sinking pump is employed, the water in the levels being scarce. Its st. cyl. 16 ins. dia., plunger 8 ins. dia. by 16 ins. str., driven by steam of 80 lbs. per sq. in.

Ventilation:—The mine being very fiery, many fans are being used, namely five Champion's fans of 4 ft. dia., all driven by induction motor of 10 H.P.

Lighting:—The Wolf's naphtha safety lamps of German make are generally used.

Coal dressing:—Manual work is generally in use at present, though preparations are now in progress to introduce the employment of engine work for the future.

Transportation:—The mine is connected with the ports of Otaru and Muroran by the Government Railway.

Number of workmen:—Underground 604; Surface 795; Total 1,399.

Motive power:—Steam; four 300 commercial H.P. Heine safety boilers, working pressure 150 lbs.

Electricity:—Two 500 K.W. 3,300 volts, 3-phases 50 cycles, turbo-generators, and two 750 H.P. Westinghouse Parson's steam turbines, all in parallel running.

Exportation to foreign countries:—None at present.

Sorachi Coal Mine.

Locality.—Situated at Utashinai, Sorachi-gun, Ishikari, Hokkaido.

Area of concession:—6,920,444 tsubo or 5,654 acres.

Annual output (1908):—249,356 tons.

When discovered:—The mine was discovered in 1854 and the company obtained concession in 1889. The operations were commenced in 1891.

Geology:—Tertiary shale and sandstone. The district is inconceivably disturbed, and the dip is from 5° to 80°.

Coal seams:—Over ten workable seams of from 2 ft. 6 ins. to 9 ft.

Quality of coal:—Bituminous caking coal; sp. gr. 1,267, moisture 0.890%, volatile matter 32.368%, fixed carbon 59.826%, ash 6.740%, sulphur 0.176%. When coked, fixed carbon 89.775%, ash 10.114%, sulphur 0.111%, caking, ashy.

Mining:—The long wall system where the dip is slow, and overhand stoping as in metalliferous mines, when the dip is steep.

Haulage:—Manual labour and horses for the underground haulage, and manual labour, electric locomotive and tramway for the surface haulage to connect the pit mouths with the screening house. Five electric locomotives of the make of Westinghouse Electric Co. are driven each by two 8 H.P. direct current motors. There are two tramways, one connecting Nishiyama level and the other Kamoi level with Kamoi screening house. In each case it is patent "Tamamura" system single ropeway of which the particulars are as follows:—

Length Nishiyama tramway, 2,182 metres, Kamoi tramway, 303 metres; Difference between the levels of the terminals Nishiyama tramway, 92 metres, Kamoi tramway, 5 metres; Difference between the highest and lowest points in the line Nishiyama tramway, 242 metres, Kamoi tramway, 5 metres; Carrying capacity per ten hour day: Coal, ascending lead Nishiyama tramway, 500 tons, Kamoi tramway, 500, tons; Timber, descending load Nishiyama tramway, 100 tons, Kamoi tramway, 100 tons; Maximum weight or size of freight units: Coal Nishiyama tramway, 560 lbs., Kamoi tramway 560 lbs.; Timber Nishiyama tramway, 3 metres, Kamoi tramway, 3 metres; Distance between consecutive cars Nishiyama tramway, 36 metres, Kamoi tramway, 36 metres; Speed Nishiyama tramway, 121 metres, Kamoi tramway, 121 metres; Motive power Nishiyama tramway, 35 H.P. Kamoi tramway, 15 H.P.; Size of rope Nishiyama tramway, 25 mm. dia., Kamoi tramway, 25 mm. dia.: Number of supports Nishiyama tramway, 32, Kamoi tramway, 3; Maximum span between the supports Nishiyama tramway, 132.73 metres, Kamoi tramway, 119 metres.

Winding:—Two direct hauling engines are in use, one of 300 H.P. steam engine and the other of 320 H.P. induction motor.

Pumping:—Two methods in use: natural drainage and pumping. In the former case the water is naturally drained out of the shaft by a ditch dug along the level. In the latter case steam or electric power is used, eight pumps being in operation at present, the particulars are:—

Steam pumping, three Worthington's plunger pumps of which one is a spare. Each has st. cyl. 22 ins. dia. by 18 ins. str. with 7 ins. dia. plunger, driven by steam of 80 lbs. per sq. in.

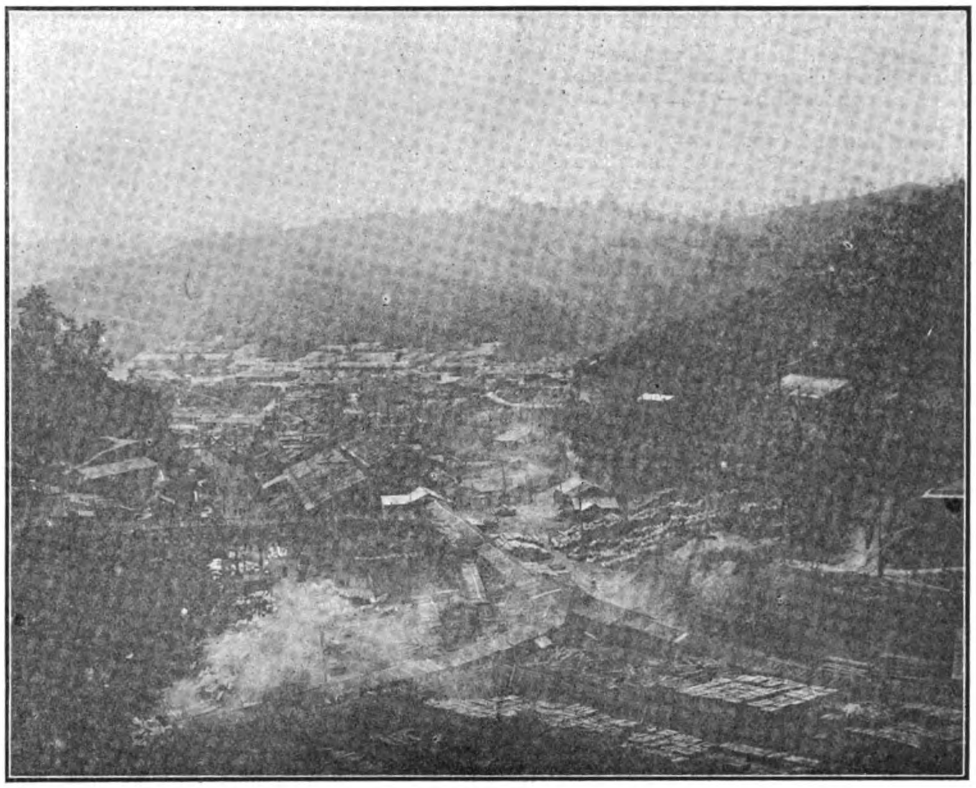
Electric pumping, one triplex plunger pump, 8 ins. str. with 6:5 ins. dia., driven by direct current motor.

Ventilation:—The mine is very fiery and many fans are used as follows:—One 35 ft. Waddle fan, driven by steam engine, 20 ins. cyl. dia. with 30 ins. str. One 20 ft. Guibal fan, driven by steam engine, 20 ins. cyl. dia. with 24 ins. str. Eight Champion's fans of from 4 ft. to 8 ft. driven by direct current motor, or induction motor of from 10 H.P. to 50 H.P.

Lighting:—None but the safety lamps in use all over the mine.

Coal dressing:—The work is done both by hand and engine, similar to the method in use at Yubari Mine No. 1.

Transportation:— The mines are connected with the ports of Otaru and Muroran by the Government Railways, the loads being taken in at Utashinai and Kamoi stations.



VIEW OF PORONAI MINE

Number of workmen:—Underground 1,004; Surface 1,076; Total 2,080.

Motive power:—Steam: Nine 24 ft. long by 6 ft. 6 ins. dia., Lancashire boiler, working pressure 80 lbs., two Babcock and Wilcock boilers with the same working pressure, and four 120 lbs. pressure Heine safety boilers. Compressed air:—One straight line pattern piston inlet air compressor, st. cyl. 24 ins. dia., air cyl. 24-1/4 ins. dia. by 30 ins. stroke, has a capacity of 1,225 cu. ft. free air per min., raised to 80 lbs.

Electricity:—Three 60 K.W. 550 volts direct current 4 poles, 1,040 R.P.M., compound wound generators, driven by 3 horizontal single cyl. 13"×12" noncondensing engines, and two 150 K.W. 3,300 volts, 3-phases 50 cycles engine type generators, driven by two horizontal double cylinder 18"×29"×19" noncondensing engines, both being worked in parallel. Two 500 K.W. 3,300 volts, 3-phases 50 cycles turbo generators plant will shortly be installed.

Foreign exportation:—None at present.

Poronai Coal Mine.

Locality:—Situated at Mikasayama, Sorachi-gun, Ishikari, Hokkaido.

Area of concession:—862,273 tsubo or 704 acres.

Annual output (1908):—190,074 tons.

When discovered:—The mine was discovered in 1868, and was first worked by the Government. It came into the company's possession in 1889.

Geology:—Tertiary shale and sandstone, and coal measure forms a big anticlinal whose axis extends about 12,000 ft. from north-east to south-west with a dip of from 18 to 70 degrees.

Coal seams:—Four workable coal seams of from 3 ft. to 5 ft. 6 ins.

Quality of coal:—Bituminous non-caking coal; sp. gr. 1.262, moisture 3.835%, volatile matter 44.175%, fixed carbon 48.817%, ash 2.960%, sulphur 0.213%. When coked, fixed carbon 94.086, ash 5.705%, sulphur 0.209%, non-caking and ashy.

Mining:—Either the longwall system or the overhand stoping similar to that which is in use in metalliferous mines is adopted according to the moderateness or steepness of the dip.

Haulage:—The coal is lowered to the main roadway either by the self-acting inclined plane or by shoot, or hauled up to the principal roadway by the hauling engine, whence to be conveyed by manual labour, horses, or endless rope haulage to the screening house.

Winding:—One direct winding engine of 300 H.P. is placed at Takinosawa shaft.

Pumping:—Four Knowle's special duplex steam pumps, whose st. cyl. 16 ins. dia. and water cyl. 7 ins. dia. by 12 ins. str. driven by steam of 80 lbs. press. per sq. in. Besides these there are two Deans vertical sinking pumps, whose st. cyl. 10 ins. dia. and water cyl. 5 ins. dia. with 16 ins. str., driven by compressed air of 80 lbs. per sq. ins.

Ventilation:—The mine being very fiery, fans are worked as follows: one 18 ft. Guibal's fan, driven by steam engine, whose st. cyl. is 16 ins. dia. by 24 ins. str. and five Champion's fans of from 6 ft. to 8 ft. each driven by induction motor of from 20 H.P. to 60 H.P.

Lighting:—The Wolf's naphtha safety lamps of German make are generally used.

Coal dressing:—Screening is principally used, and washing is done by jigging machines and troughs.

Transportation:—The mine has connection with the ports of Muroran and Otaru by the Government Railway.

Number of workmen:—Underground 1,109 Surface 638. Total 1,747.

Motive power:—Steam: One 16 ft long by 5 ft. dia. Cornish boiler working pressure 80 lbs. Two 20 ft. long, by 5 ft. 6 ins. dia., Lancashire boilers working pressure 80 lbs. Six 24 ft. long, by 6 ft. 6 ins. dia., Lancashire boilers working pressure 80 lbs. Two 27 ft. long, by 6 ft. 6 ins. dia., Lancashire boilers working pressure 80 lbs.

Compressed air:—One straight line pattern piston inlet air compressor, st. cyl. 24 ins. dia., air cyl. 24-1/4 ins dia., by 30 ins. str., has a capacity of 1,225 cu. ft. free air per min. raised to 80 lbs. pressure.

Electricity:—Two belt driven, 3-phases, delta connected revolving field alternators, 185 K.W. 550 volts, 194 amperes, 50 cylces, one of them driven by horizontal tandem compound condensing engine, high pressure cylinder 14 ins. dia. low pressure cylinder 25 ins. dia. by 18 ins. str., and the other horizontal single cyl. noncondensing engine, st. cyl. 22 ins. dia., by 20 ins. str.

Foreign exportation:—None at present.

Ikushunbetsu Coal Mine.

Locality :—Situated at Mikasayama village, Sorachi-gun, Ishikari-no-kuni, Hokkaido.

Area of concession :—718.227 tsubo or 1,578 acres.

Annual output (1908) :—78,081 tons.

When discovered : — The mine was discovered in 1880 and was first worked by the Government in 1885. The company acquired it in 1889.

Geology : — Tertiary shale and sandstone. The measure strikes north and south dipping east with the average inclination of 70 degrees.

Coal seams :—Four workable seams of coal within 400 ft. The thickness varies from 3 ft. to 7 ft.

Quality of coal :—Bituminous non-caking coal, sp. gr. 1.242, moisture 2.070%, volatile matter 49.242%, carbon 44.463%, ash 4.090%, sulphur 0.135%. When coked, carbon 91.432%, ash 8.410%, sulphur 0.188%, non-caking, light brown.

Mining :—The coal getting is done by overhand stoping.

Haulage :—Manual labour and horses,

Lighting :—The safety lamps are exclusively used.

Coal dressing :—Screening is all done by manual labour.

Transportation :—The mine has connection with the ports of Otaru and Muroran by the Government Railway.

Number of workmen,—Underground 423, Surface 303, Total 726.

Pumping and winding :—The mine being worked above drainage level, at present, there is no pumping and winding engines.

Ventilation :—The mine not being fiery, only one 6 ft. Champion's fan driven by steam engine, st. cyl. 7 ft. by 10 ins. str.

Foreign exportation :—None at present.

Cokes.

Oiwake Coke Ovens.

Locality :—Near Oiwake railway station on the Government Railway, and about 62 miles from the port Muroran,

Area of the ground owned by the company :—34 acres.

Annual production (1908) : —8,800 tons.

History :—The plant was opened to work by the company in 1901.

Coals used in coke making :—Coals are supplied from the Sorachi and Yubari coal mines.

Coke ovens :—Fifty Coppee pattern ovens, at present.

Washing :—Washing plant consist of four feldspar jiggers, two disintergrators, and five bucket elevators.

Motive power :—Boilers : two 24 ft. 3 ins. long by 6 ft. 3 ins. dia. Cornish boilers working pressure 80 lbs. Steam engines : One horizontal single cylinder non-condensing engine st. cyl. 14-1/2 ins. dia. with 26 ins. stroke, and one vertical single cylinder non-condensing engine st. cyl. 13 ins, dia. with 24 ins. stroke, one steam driven coke pushing engine with one vertical boiler mounted on the same carriage.

Coke making :—Four to five tons of coal each oven are the usual charge and the yield of coke is from 60% to 70% after 48 hours firing.

Quality of coke : — Specific gravity 1.63, Moisture 0.71%, Volatile matter 1.01%, Fixed carbon 86.60%, Ash 11.58%, Sulphur 0.07%.

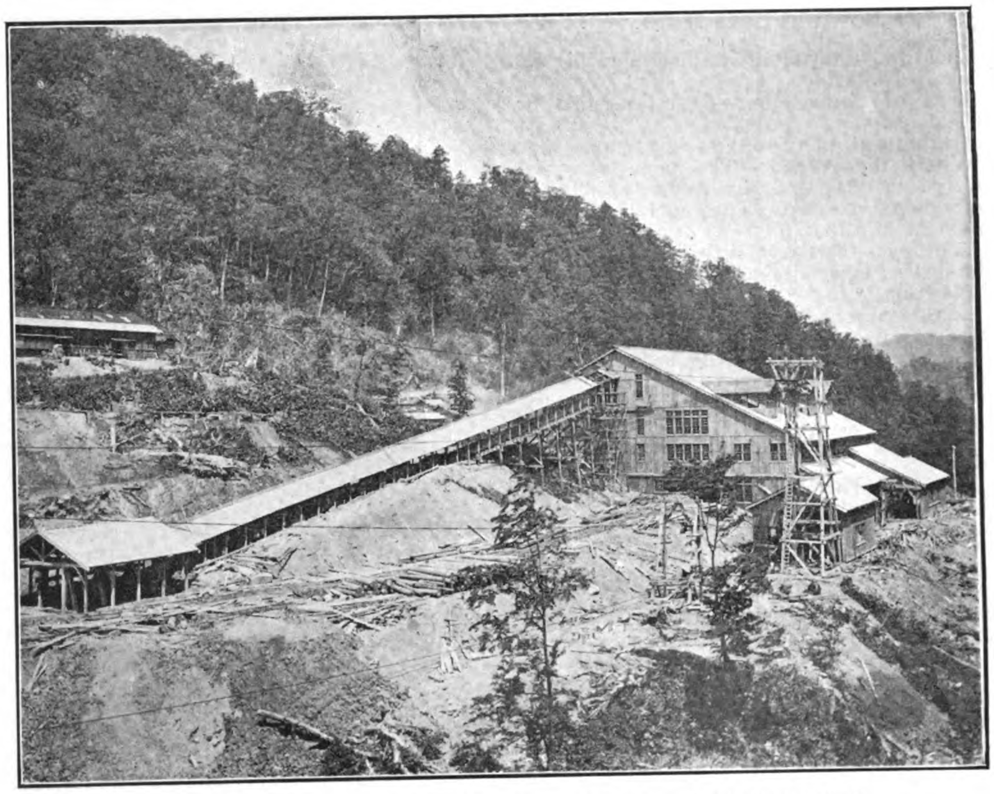
Number of workmen :—Altogether 153.

Iron Sand. (bricket.)

Occurrence of Iron Sand :—Volcano Bay Coasts, Hokkaido,

Annual production ;—About 20,000 tons.

Manufacture of Iron Sand Bricket :—Iron Sand containing in average 60% of iron is gathered, and then roasted in a reverberatory furnace. Being next removed into a mixing machine with sauce combining chemicals, the ingredient is treated with water and steam for about an hour. It is then pressed into a fixed sized bricket. The bricket is put in a retort and subjected to steam pressure of about 7 atm. for 8 hours. Then the solidified bricket is smelted in the blast furnace together with other iron and manganese ores.



SCREENING MACHINE AND AERIAL TRAMWAY AT MANJI MINE

Iron Sand Bricketing plant :—The bricketing processes are all mechanical the following principal machines being used for the purpose :—1 Ball Mill with double screens; 1 Roll Mill with double screens; 1 Mixing machine with steam jacket ; 1 Bricket-press with automatic feeder ; 2 Steam retorts (2 M. by 16.5 M.) driven by 165 K.W. electric power.

Wanishi Iron Work.

Locality :—Situated to the north east of Wanishi Village, Muroran District, Iburi Province, Hokkaiko. It is three miles from Muroran and faces the Muroran Bay.

Area of Ground :—About 50,000 *tsubo* (40 acres).

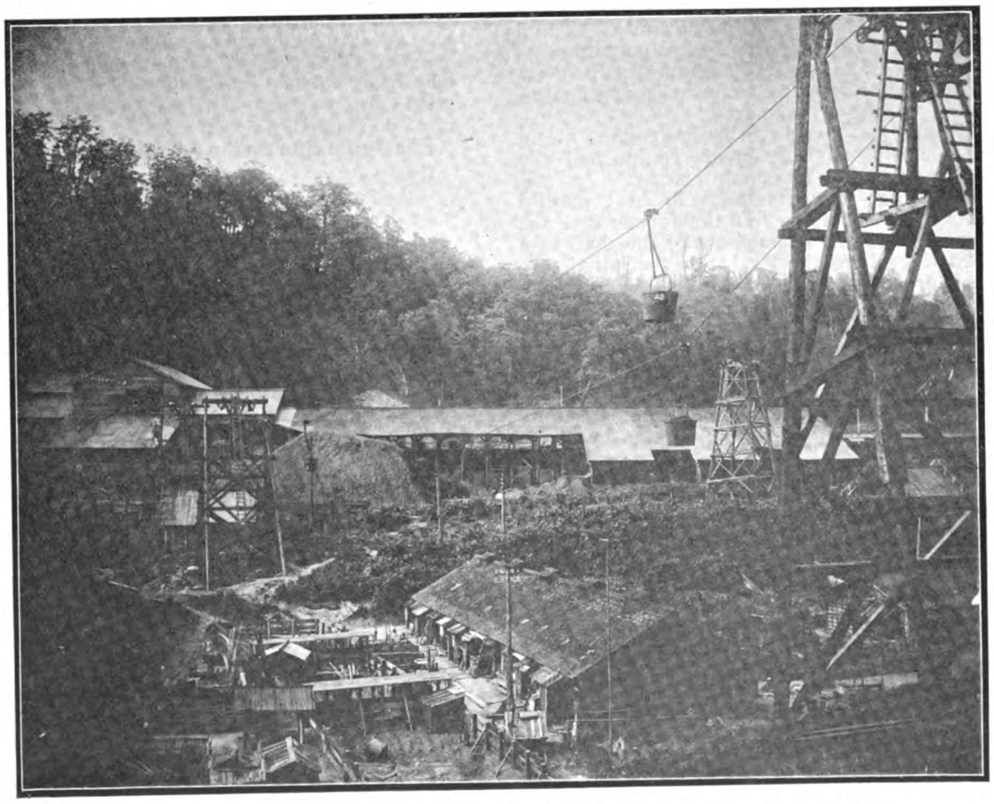
Annual production :—About 20,000 tons.

History :—The Works were started in July Meiji 42 (1909).

Smelting materials :—The Works draw the principal part of their supply of smelting materials from iron sand found in the coast of Volcano Bay, Hokkaido, supplemented by iron and manganese ores from several parts of the Empire.

Blast Furnace :—One blast furnace about 24 M. high and 200 cubic M. of inside volume, producing about 50 tons pig iron per day,

Winding hoist :—The total height of hoist 28.5 M., iron construction, driven by electric engine of 50 H.P.



SCREENING MACHINE AND AERIAL TRAMWAY AT SORACHI MINE

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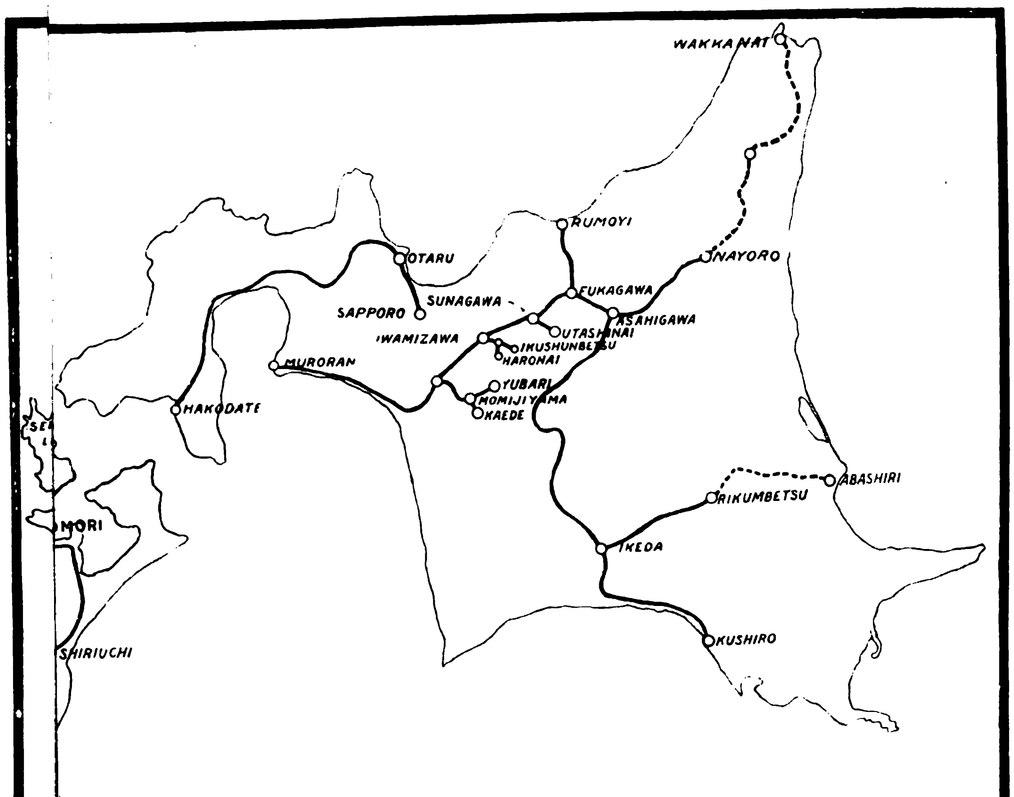

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Gas purifier:—Four vertical pipes of 1.5 M. diam. each connected to one another and with inside water spray.

Hot blast stoves:—Three Cowper stoves 21.5 M. high by 5.6 M. inside diam. each.

Power and Engine plant:—Boilers—five 200 H.P. Lancashire boilers, made to use either coal or waste gases from blast furnace.

Electric Generator:—One 250 K.W. 550 volts 3-phase Westinghouse alternate current generator, directly connected to McIntosh and Seymour horizontal tandem engine.

Blowing Engine:—One horizontal compound condensing engine of about 500 H.P., the capacity of 300 cb. M. of cold air per minute against a pressure of 0.6 atom., made by Cockerill Co., Belgium.

Manufacture of Pig Iron: — Iron sand bricket and iron ores are together smelted in the blast furnace, making about 50 tons of pig iron per day. Principal products are foundry and Martin Pigs, Spiegeleisen and ferromanganese, mainly used as materials of steel manufacture at the Japan Steel Works Ltd. The by-products are slag wool and bricks.

Number of workmen:—Altogether 310.

THE RAILWAYS OF JAPAN

In order to unify the arrangements of transportation in Japan and promote its economic advantages, the Government, according to the Railway Nationalisation Law, issued in March, 1906, purchased the lines belonging to seventeen Railway Companies, namely the Kōbu, Hokkaidō-Tankō, Ganyetsu, Nippon, Nishinari, Sanyō, Kyūshū, Hokkaidō, Kyōto, Hankaku, Hokuyetsu, Sōbu, Bōsō, Nanao, Tokushima, Kwansai, and Sangū. Their aggregate mileage on the day of purchase was 2,823 miles, and the total amount of loan bonds delivered to the private railway companies as purchase-price was *yen* 476,318,800 (£ 48,788,159), which was completely paid on the last day of July, 1909.

The working of the Japanese Railways during the year 1910-11 according to the "Twelfth Financial and Economic annual," 1912, gave the following results:—

Of the aggregate working mileage, 4,870 miles were represented by the State lines, 484 miles by the private lines, and 706 miles (618 miles of broad gauge and 88 miles of narrow gauge) by the South Manchuria Railway Company's lines, making a total of 6,060 miles. The number of passengers totalled 166,888,048, and freight tonnage 31,718,399 tons, while the traffic receipts amounted to *yen* 109,481,513 (£ 11,213,921), in which *yen* 52,783,202 (£ 5,406,453), represented coaching receipts, *yen* 54,228,136 (£ 5,554,454) freight car receipts and *yen* 2,470,175 (£ 253,014) miscellaneous receipts.

On the State lines, average working mileage for passenger was 4,815.9 miles and for goods traffic 4,764.2 miles. The number of passengers was 138,629,706 and goods amounted to 25,481,868 tons. Traffic receipts were:—passenger *yen* 46,483,237 (£4,761,163); goods *yen* 41,408,438 (£ 4,251,607); sundry *yen* 1,344,917 (£ 137,757); total *yen* 89,336,592 (9,150,527). The working expenses, interest on loans, etc., amounted to *yen* 76,509,849 (£ 7,836,715) and the net profit, deducting the said items of expenses from the receipts, came to *yen* 12,826,743 (£ 1,313,812.) The estimated receipts and expenses of the Imperial Government Railways for the financial year 1912-13 are, receipts *yen* 100,092,658 (£ 10,252,244) and expenses *yen* 89,485,107 (£ 9,165,739), giving a net profit of *yen* 10,607,551 (£ 1,086,505): in these expenses is included *yen* 34,364,226 (£3,519,843), the interest on the public loans for the purchased railways, etc.

The law relating to Light Railways was issued in April, 1910, and put into force in August of that year. The construction of light railways was formerly subject to various inconveniences, as it was practically regulated by the ordinary railway or the tramway regulations. It was to obviate this difficulty that the special measure was adopted. This legislative measure guarantees the profit of private light railways within the limit of 5 per cent. of the construction expenses. It is expected that owing to this encouragement, light lines representing a cost of construction of *yen* 10,000,000 (£ 1,024,275) will be laid every year.

The private and light railways existing at the end of the year 1910-11, including those for which charters were newly issued, numbered 59, with an aggregate capital of *yen* 79,051,000 (£ 8,096,999), of which 22 companies had their lines open to traffic. They carried during the year 25,009,254 passengers and 2,314,367 tons of goods, while the traffic receipts and expenses were *yen* 4,473,317 (£458,191) and *yen* 2,143,316 (£ 219,535) respectively, leaving a balance of *yen* 2,330,001 (£ 238,656) as profit. The cost of construction of open lines amounted to *yen* 32,109,409 (£ 3,288,888).

The report of the Japanese State railway business for the last half-year makes a very satisfactory showing. The total receipts during the six months ending June 30, 1912, reached 52,085,693 yen, the figures covering the passenger fares and freight revenue. This is an increase of about 9 per cent. over the 4,201,984 yen of the first half-year of 1911. The monthly report of the receipts is as follows:—

	Receipts	Running Mileage	Average receipts per mile per day.
	Yen		Yen
January	7,522,970	5,025	48,303
February	7,534,067	5,025	51,700
March	9,288,480	5,044	59,497
April	10,411,333	5,055	68,654
May	9,374,106	5,055	59,920
June	7,954,737	5,063	52,371
Total	52,085,693		

As will be seen from the above table the receipts continued to increase during the first four months, the daily receipts per mile increasing from 48 yen in January to 68 yen in April. Since May the receipts have been on the decline the figures for June falling to 52 yen, which, however, is an increase of about 4 yen compared with the 48 yen of January.

Classified into passenger and freight receipts, the figures are as follow:

PASSENGER FARES

	No. of passengers	Receipts	Average receipts per day per mile.
		Yen	Yen
January	11,552,481	3,689,410	23,689
February	10,612,272	3,616,341	24,816
March	13,475,847	4,993,259	31,984
April	17,449,457	6,001,490	37,575
May	14,041,740	4,938,598	31,515
June	10,890,133	3,782,433	26,902
Total	78,621,930	27,021,531	

FREIGHTAGE RECEIPTS

	Quantity of freight	Freightage receipts.	Average receipts per day per mile.
January	2,403,849	3,833,560	26,614
February	2,442,386	3,927,727	26,884
March	2,646,885	4,296,221	27,513
April	2,618,429	4,409,843	29,579
May	2,711,860	4,435,503	28,305
June	2,543,702	4,172,304	27,469
Total	15,367,111	25,064,162	

The total number of passengers on all lines during the half-year was over 78,000,000, and the freight was over 15,000,000 tons. The receipts therefrom amounted to over 27,000,000 and 25,000,000 yen respectively. Compared with the corresponding period of last year, the figures show an increase of over 5,800,000 in the number of passengers and over 1,700,000 tons in the volume of freight, netting an increase of over 1,400,000 and 2,700,000 yen respectively in receipts.

What is to be noticed is the conspicuous increase in the freight receipts, which is at a much greater rate than passenger receipts. This is gratifying, as indicating that the State railway is gradually evolving from a passenger to a freight standard.

The first line constructed in Japan was the Tokyo-Yokohama section. The work was started in 1870 and the section was opened in 1872. This was followed by the Osaka-Kobe section, which was opened in 1874. The progress of construction since that time may be inferred from the following quinquennial figures covering up to the end of the year 1910.

	Government.	Private.	Total.
	m.	m.	m.
1872	18.0	0	18,0
1875	38.0	0	38.3
1880	98.3	0	98.3
1885	223.8	134.7	358.5
1890	550.6	848.6	1,399.2
1895	593.3	1,697.2	2,290.5
1900	949.9	2,905.2	3,855.1
1905	1,531.8	3,251.2	4,783.0
1910	4,863.1	507.0	5,370.1

The sudden addition to the mileage of State lines after 1905 was due to the nationalization of 17 leading private lines between 1906 and 1907, with the object of unifying railway administration and promoting the efficiency of the service. At present the private lines consist of local lines of comparatively short length. The administrative organization of the Imperial railways consists of a head office located in Tokyo, with five District Superintendent Offices to supervise the lines under traffic. For lines under construction special offices are provided to take charge of the work. At the end of 1910 the lines in course of construction aggregated about 313 miles. The existing gauge is that of 3 ft. 6 ins. The gauge being judged inadequate to meet the requirement of the steadily expanding volume of traffic, it was thought advisable to adopt the standard gauge and to reconstruct as first program the trunk line of over 700 miles from Tokyo and Shimonoseki in 13 years. A measure for this purpose has been introduced into the Imperial Diet now in session, so that it may be concluded that the reconstruction scheme will be realized in the near future.

The maximum gradient is 1 in 40 in ordinary cases with the minimum radius of 15 chains. A notable exception is the case of the Usui pass on the Tokyo-Nagano line for which the Abt system was adopted. The gradient for it is 1 in 15, for the section of 7 miles from Yokogawa to Karuizawa, with the minimum radius of 13 chains. There are 26 tunnels with the aggregate length of 14,645 ft. Altogether this section forms the worst portion in the whole work of railway construction in Japan. The steam locomotive engines used on this section at present are to be replaced with electric engines, with the double object of increasing the hauling power and getting rid of the nuisance of smoke. The work is now under progress.

In regard to tunnelling work, that bored at Sasago on the Tokyo-Shiojiri of the Central line, is the longest. It measures 15,280 ft., required about six years, and was opened to traffic in February, 1893. In bridge work the longest structures are that over the river Tenryu (3,967 ft.), the second over the Oi (3,332 ft.), and the third over the Banyu (2,126 ft.), all in the Tokaido line. The foundation work for all such bridges is in the shape of cylindrical brick well. Superstructures are of steel generally but in rare cases wrought iron girders used in bridges made in the early days of railway construction are mixed with them. Rails used are in most cases 60 lb. per yard steel rail but they are to be replaced with 75 lb. type for trunk lines, in view of the steady expansion of the volume of traffic and the necessity in consequence to run heavy trains. The rails formerly used came from abroad, but of

late the rails turned-out at the Government Steel Works at Yawata, Kyushu, are used.

The standard dimension of the sleepers is 8" × 5½" × 7'0," and 14 to 16 are laid for every 30 ft. of rails. Chestnut wood is predominant, but owing to growing scarcity of this particular lumber, softer varieties as pines, *tamo*, cercidiphylum, *sen*, beech, are mixed, after they are properly creosoted.

The principal items of improvement work now in hand are enumerated as follows:—

Quadrupling the Tokyo-Yokohama section. The double line now existing being found insufficient to meet the requirement of the growing traffic between the two important emporiums, it has been decided to add two more lines. Of the four, two will be devoted to carrying passengers alone and will be worked with electric motive power. Shimbashi, Shinagawa, Yokohama and all other stations on the section are receiving alteration which this innovation requires.

The street railway work in the metropolis is designed to lay an elevated line across the principal streets of the city and to connect the city termini of Shimbashi, Uyeno, etc. The central station is now in course of erection at Yurakucho, not far from the Imperial Palace.

Improvement of Stations.—The existing station of Kyoto being too narrow in space, while the construction of crossings will become more and more difficult in view of the rapid expansion of the streets in the neighbourhood, it has been decided to construct at the rear of the present premises a commodious station on a elevated level. The design is now being prepared. Similar improvement is being contemplated for Osaka and other stations.

Land and Sea connection Works.—The work for effecting through connection between land and sea is either under progress or being designed for Osaka, Nagoya, Aomori, Hakodate, Muroran, Mikuni and other places.

Additional Tracks to be Laid.—This addition is to be made for sections now in single track but which is no longer able to handle with desired efficiency the growing volume of traffic. The doubling work now under progress aggregates about 216 miles. Other improvement work as about bridge girders, tracks and so forth is undertaken for the entire lines, the sum appropriated for all the above mentioned works account in the 1910 Budget amounting to Y12,000,000. To this should be added similar outlays on account of rolling stock, ferry steamers, electric plant, etc., these increasing the total improvement estimate for the year to Y19,555,000.

Of the lines now under construction may be mentioned the Central line, Toyama line, Ganyetsu line, Oita line, Bose line, Shinjo line, Teshio line and Abashiri line. The total outlay for the new lines amounts to 20,945,000 yen in the Budget mentioned above.

Beside a large amount spent in construction and improvement, there is a contemplated project of reconstructing the trunk lines on the wide gauge system, so that the future of the State railways of Japan may be said to be full of promise and interest.

Consul General Thomas Sammons, Yokohama, sends the following report to the State Department, on the conversion of Japan's railways.

In connection with the plan to provide Japan with railways of the 4 feet 8½ inches gauge it is estimated that $22,500,000 worth of foreign railway materials will be required. It is not believed that the high-class machinery required can be supplied as yet by domestic foundries, and even though the proper grade of rolling stock, girders for bridges, and other materials could be supplied in Japan the facilities are not sufficient at present to guarantee the production of the large quantities needed.

Special meetings to consider the question of protecting and encouraging home industries are being held, the investigations involved being based upon the following memorandum:

As regards the question of broadening the gauge of the railroads, the following table of materials which have been imported from abroad during the past five years may be usefull in preparing future budgets:

Year.	Value of materials from abroad.	Value of materials, native products, supposed to have come mostly from abroad.	Total.
1906 - - - -	$919,708	$340,985	$1,260,693
1907 - - - -	3,719,642	1,170,819	4,890,461
1908 - - - -	970,236	594,269	1,564,505
1909 - - - -	998,374	851,468	1,840,842
1910 - - - -	3,160,649	926,540	4,087,189
Total - -	9,768,609	3,884,081	13,652,690

The amount of material supposed to have come from abroad totaled some $3,884,081 in value, while the total value of that actually known to have been imported totaled $9,768,109. Comparing these figures with the total amounts expended on repairs during these years, we have:

Year.	Amount expended for construction and repair.	Imported.	Per cent imported.
1906 - - - -	$10,641,126	$1,260,693	11.8
1907 - - - -	14,796,217	4,890,461	33.5
1908 - - - -	18,137,204	1,564,505	8.62
1909 - - - -	15,923,392	1,849,842	11.6
1910 - - - -	22,924,142	4,087,189	17.82
Total - -	82,472,581	13,652,690	16.55

The materials which must be imported from abroad consist of the following: Rails and their accessories, girders, machinery for machine shops, engines, wheels, and cars, and machines for the generation of electricity.

The revised estimates of the committees in charge of the scheme to broaden the national railroads limit the time to 12 years, which may possibly be reduced to 8 or 10 years, as circumstances warrant. The figures are as follow:

Year.	Annual allotments for 12 years.	Annual allotments for 8 years.	Annual allotments for 10 years.
1912 - -	$2,241,000	$7,719,000	$5,478,000
1913 - -	2,988,000	15,438,000	8,466,000
1914 - -	4,980,000	17,679,000	10,458,000
1915 - -	6,474,000	17,679,000	13,446,000
1916 - -	6,974,000	15,438,000	14,940,000
1917 - -	7,470,000	14,940,000	14,940,000
1918 - -	12,450,000	14,442,000	12,450,000
1919 - -	13,446,000	11,212,968	12,450,000
1920 - -	13,446,000	- - - - - -	11,205,000
1921 - -	14,940,000	- - - - - -	8,070,588
1922 - -	14,940,000	- - - - - -	- - - - - - -
1923 - -	13,145,208	- - - - - -	- - - - - - -
Total.	113,492,208	114,547,968	111,903,588

JAPAN'S FINANCIAL AND ECONOMIC CONDITION IN 1911

That excellent compilation, "The Financial and Economic Annual of Japan" has been issued for 1912, and provides some interesting data on Japan's financial and economic condition during 1911. We take from it the following:—

"The Government has for years past been making every effort to consolidate the basis of annual account by maintaining the balance of annual revenue and expenditure and effecting the redemption of the national debt; and in framing the Budget for the Financial Year 1911-12 on this plan, the Government has within the limits which permit of the maintenance of a strong financial basis, have made various projects which have, in view of the state of affairs at home and abroad, been rendered urgent by the course of national progress. The principal projects are the following:—

Recognising the necessity of completing the national defence in view of the latest condition of the navies of the world, the Government has made suitable alterations in the already-fixed programme of naval and ordnance construction and revised the plan of the perfection of naval defence; thus, the already-fixed continuing expenditure for that purpose has been increased by *yen* 82,223,170 (£8,421,916) to be spread over six years from the current financial year, the addition to the already-fixed amount allotted to this year being *yen* 14,869,723 (£1,523,069).

Japan being exposed to frequent inundations, the Government, recognising the necessity of making plans for a radical improvement of waterways, has decided upon a programme for the first period of the undertaking at the total cost of *yen* 193,087,471 (£ 19,777,473) spread over eighteen years from the current financial year, the amount appropriated for this year being *yen* 12,794,750 (£ 1,310,535).

Since the adjustment of the organs of communication and promotion of industrial development are matters of utmost urgency to national progress, plans have been made for the construction of several lines in addition to those already under construction simultaneously with a great improvement of the existing railways and for encouraging the construction of light railways to serve as aids in the communication between the existing railways; and the already-fixed expenditures are to be supplemented by a total sum of *yen* 43,172,964 (£ 4,422,100) in the construction expenses and of *yen* 52,843,369 (£ 5,412,616) in the improvement expenses, making a total of *yen* 96,016,333 (£ 9,834,716). The former work is to be completed in seven years and the latter in ten; and the amount to be expended during the current financial year is, if the already-fixed expenditure for the year is included, *yen* 23,400,000 (£ 2,396,804) for construction and *yen* 28,532,803 (£ 2,922,545) for improvement, making a total of *yen* 51,932,803 (£ 5,319,349).

As it is necessary to promote the welfare and happiness of the people of the newly-acquired Japanese territory of Korea by developing its natural resources, various plans have been made in regard to the construction and improvement of railways, accommodation for land and sea connection, construction and repair of roads, aiding of various industries, and cadastral survey; and the amount required from the general account for carrying out these plans is *yen* 12,350,000 (£ 1,264,980), which when compared with the amount defrayed out of the general account during the preceding year to the former Government, shows a net increase of *yen* 1,360,981 (£ 139,402).

It has also been decided to defray so far as reliable sources of revenue permit such expenditures of urgent necessity to national development as an increase in the expenditures for educational institutions, grants to primary-school educational funds, expenditures for the extension of the steel-foundry, and annual sums allotted for telephone exchange expenses, and an increase in the expenditures required for the improvement of the Shimonoseki Straits and construction of breakwaters in Kobe Harbour. With regard to the national debt, the past policy has been followed, and so far from a public loan being raised for the general account, *yen* 50,000,000 (£ 5,121,377) is to be appropriated during the current year to the fund for the redemption of the principal.

The total amount of the Budget for the Financial Year 1911-12 which was framed on the above-mentioned plan and was approved by the Diet in its twenty-seventh session, came up, the Supplementary Budget included, to *yen* 568,903,916 (£ 58,271,424) for both the revenue and expenditure. During the ensuing session the Diet passed another Supplementary Budget

for *yen* 5,093,081 (£ 521,672), which was rendered necessary by the revolutionary disturbance in China and an increase in the cost of army provisions due to the rise in the price of rice; and if this Budget is also included, the total amount for both the revenue and expenditure would be *yen* 573,996,997 (£ 58,793,096). The carrying out of the General Budget happily produced financially and economically good results.

On comparing the actual results of the revenue for the Financial Year 1910-11 with the Budget estimates, we find that among the taxes and duties in the ordinary revenue section, although there was an increase in the receipts from the business tax, sugar excise, and bourse, travelling, and succession taxes, the great floods which devastated various parts of the country led to remissions and postponements of payments of the land-tax, involving a large sum, and the receipts from the *saké* tax, textiles consumption tax, and especially, Customs-duties fell below the estimates, so that there was a net deficit of *yen* 2,940,121 (£301,149); but there was, on the other hand, an excess over the estimates of *yen* 3,111,266 (£318,679) in stamp-receipts and *yen* 2,483,545 (£254,383) in the receipts from Government enterprises and State property, making a net excess of *yen* 4,037,432 (£413,544). In the extraordinary revenue section, the sum brought over from the preceding year's account exceeded the estimates by *yen* 117,781,701 (£12,064,089) and the miscellaneous receipts similarly exceeded the estimates by *yen* 2,813,640 (£ 288,194), the total excess in this section being *yen* 120,586,009 (£12,351,327). In short, the actual total revenue amounted to *yen* 672,873,755 (£68,920,798), which is an excess of *yen* 124,623,441 (£12,764,872) over the estimated total revenue of *yen* 548,250,314 (£56,155,927).

Next while the time has not yet arrived for ascertaining the actual results of the revenue for 1911-12, it is anticipated at present that among the taxes and duties in the ordinary revenue section, although the receipts from the land tax, *saké* tax, and customs-duties, may not be up to expectations, there will be large receipts from the income, business, succession, and travelling taxes, sugar excise, and bourse tax, making a net excess over the estimates of *yen* 4,000,000 (£409,710), and as there will probably be an excess of *yen* 4,000,000 (£409,710) in stamp-receipts and of *yen* 3,000,000 (£307,283) in the receipts from Government enterprises and State property, the total excess will be about *yen* 11,000,000 (£ 1,126,703). In the extraordinary revenue section, it is believed, through there will be a falling-off of about *yen* 6,000,000 (£614,565) in the transfers of the proceeds of public loans and river improvement fund, there will be an excess of *yen* 1,000,000 (£ 102,428) in the miscellaneous receipts and above all, an increased receipt of *yen* 76,000,000 (£ 7,784,492) in the sum brought over from the preceding year's account, and the total excess is expected to reach *yen* 71,000,000 (£7,272,355); and thus the actual total revenue will, it is thought, exceed the estimates by about *yen* 82,000,000 (£8,399,058).

Japan's Economic Condition.

A general survey of the condition of the economic world in Japan during 1911 shows that the new enterprises which had been planned in 1910 materialised and reached the practical stage in this year; a large amount of municipal loans, debentures, and foreign public loans was issued in the home market, the work of constructing and improving railways in Japan Proper and Korea was continued from the preceding year and made great progress during 1911, and there was a large volume of importations in anticipation of the enforcement of the revised Customs Tariff; that through these circumstances, the money-market which had almost touched the extreme limit of slackness in the preceding year became more and more stringent every month from the beginning of the year notwithstanding the cash redemption of internal loans to the amount of *yen* 65,000,000 (£6,657,790) in May and of *yen* 20,000,000 (£2,048,551) in December, with the result that the issue of convertible notes reached at the end of the year the unprecedented figure of *yen* 435,500,000 (£ 44,607,190), and the rate of interest (average daily rate of discount in Tokyo) rose from 1.5 *sen* to 1.9 *sen.*, and that in spite of these facts, the promising trade condition in Japan Proper and Korea was such that the year closed with our industries in a healthy state although they were not a little affected by the revolutionary disturbance in China in the last months of the year.

The amount of capital invested in new enterprises during the year was *yen* 361,000,000 (£36,976,339), a decrease of *yen* 126,000,000 (£ 12,905,869) on the figure for the preceding year which was *yen* 487,000,000 (£49,882,208); but if we take into consideration the special circumstances for the decrease of capital due to the purchase by the Tokyo Municipality of the business of the Tokyo Railway Joint-stock Company whose nominal capital was *yen* 60,000,000 (£6,145,652) and paid-up *yen* 43,000,000 (£ 4,404,384) and leave these figures out of account, the increase of nominal and paid-up capital and issue of debentures and other stocks are, as stated below, in excess of those during the preceding year; they show that we have now passed from the project stage of the previous year to the practical stage. Thus, the increase of nominal capital during 1911 reached *yen* 300,000,000 (£30,728,260) if we leave out the above-mentioned special case of the Tokyo Railway Company, which is an increase of *yen* 129,000,000 (£ 13,213,152) on the previous year's figure of *yen* 171,000,000 (£17,515,108), while the increase of paid-up capital, the case of the Railway Company being again left out, was *yen* 146,000,000 (£14,954,420), whereas the preceding year's was *yen* 131,000,000 (£13,418,007), an increase of *yen* 15,000,000 (£1,536,413); the issue of debentures amounted to *yen* 95,000,000 (£ 9,730,616), an increase of *yen* 7,000,000 (£ 716,993) on the preceding year when the issue was *yen* 88,000,000 (£9,013,623), while local loans were issued to the amount of *yen* 38,000,000 (£3,892,246) against *yen* 12,000,000 (£ 1,229,130) in 1910, an increase of *yen* 26,000,000 (£ 2,663,116). Moreover in 1911, a Chinese loan of *yen* 10,000,000 (£ 1,024,275) was for the first time raised in the market.

Turning, next, to the condition of the foreign trade, we find that the exports amounted to about *yen* 447,000,000 (£ 45,785,107) and the imports *yen* 513,000,000 (£ 52,545,324), making a total of about *yen* 961,000,000 (£98,432,859) and the imports exceeding the exports by *yen* 66,000,000 (£ 6,760,217). It is but in the natural order of progress that the total volume of trade for the year should exceed that for the year preceding by *yen* 38,000,000 (£3,892,246) and be the highest figure reached; and although the excess of imports which rose last year to the enormous sum of *yen* 66,000,000 (£6,760,217) against only *yen* 5,000,000 (£512,138) in 1910 was due to the facts that large quantities of articles subject to increased duties under the new Customs tariff were imported in anticipation of the enforcement of that tariff from the 17th July last, the figures for the trade with Korea which had almost invariably shown an excess of exports were, on account of the annexation of the peninsula, entirely excluded from the trade returns for 1911, and the trade in cotton yarn and other important articles of export to China was seriously affected by the revolutionary disturbance in that country last autumn, still the fact that the principal articles of import were raw cotton, manures, iron, and machinery, all articles which are either raw materials for productive industry or are of service in its development, proves that the excess of such imports will in no way hinder the healthy development of our foreign trade.

Although the progress of new enterprises above referred to already proves that our economic world has recovered from the depression of trade, a further evidence of the fact is furnished by the business condition of the Imperial railways. The total tonnage of goods carried in 1911 amounted to 27,950,000 tons, an increase of 3,810,000 tons on the preceding year, and the receipts therefrom increased correspondingly by *yen* 5,240,000 (£ 536,720) to *yen* 45,850,000 (£ 4,696,302), while the number of passengers carried in the same year was 145,000,000, an increase of 13,000,000 on the preceding year, and the receipts from this source increased by *yen* 5,860,000 (£ 600,225) to *yen* 50,000,000 (£ 5,121,377), making the increase from both sources *yen* 11,110,000 (£ 1,137,970) and the total receipts *yen* 95,860,000 (£9,818,703), the largest figure reached since the nationalisation of the railways. As this prosperous condition promises to continue, we may expect to see still better results during the current year.

WATERWORKS IN THE PHILIPPINES

The preliminary investigation and report for a water-supply system for the city of Iloilo has been made and submitted to the proper authorities. In the establishment of this system, three projects, estimated to cost as follows, were investigated and reported upon:

Jaro filtration project..............	P817,000
Tigum River gravity system, steel pipe line.......................	1,064,000
Tigum River gravity system, cast-iron pipe line..................	1,394,000

The population of Iloilo, Molo, and Lapaz to be covered by the water system is estimated at 55,500. The municipalities above mentioned are at present without fire protection and the local supply of drinking water is not nearly sufficient for home consumption. During the past year two considerable fires have occurred in Iloilo, one, September 2, 1911, destroying property to the value of approximately P500,000. Owing to the total inadequacy of fire protection the insurance rate in Iloilo is at present about 3½ per cent. It is estimated that Iloilo has paid out on an average P24,000 per year for drinking water, secured mainly from streams and springs on the Island of Guimaras. Drinking water is sold in Iloilo at certain seasons of the year for 3 centavos per gallon. The source of water supply for the gravity systems above mentioned is the Tigum River at a point approximately 31 kilometers northwest of Iloilo.

San Pablo, La Laguna.

Complete preliminary investigations and plans for the installation of a gravity water system for San Pablo, La Laguna, have been made. The sources of water for the system investigated and approved are springs about 6 kilometers east of San Pablo at the foot of the San Cristobal Mountains. The estimated cost for the system complete is P81,000, and it is calculated that it will supply a minimum of 750,000 gallons per day. This supply will afford ample fire protection and sufficient water for all other purposes for many years to come. It has been recommended that a loan be granted the municipality for the partial construction of this water system.

Canoan, Siquijor Island.

Lieutenant-Governor James R. Fugate, of Siquijor Island, who has been handling all construction projects on the Island of Siquijor, a subprovince of Oriental Negros, has practically completed a gravity system for Canoan, Siquijor Island. The water of several small springs was collected into one large reservoir and brought into the municipality by means of a 2½inch pipe line. A circular fountain in the center of the town serves the whole population and eliminates the 2-kilometer walk which was previously necessary to secure potable water.

Siquijor, Siquijor Island.

A second and more important water system has been constructed by Lieutenant-Governor Fugate in the town of Siquijor on the island of the same name. An allotment of P18,000 of Insular funds was secured for the purchase of material only, the municipal officials guaranteeing to receive the material at the ship's side and to do all the work necessary for the installation of the system. The municipality carried out its promise to the letter and constructed a main line of 4-inch and 3-inch pipe for a distance of 4 kilometers from the spring to the town, and also a distribution system which supplies all the population for 4 kilometers east and west of the town. Lieutenant-Governor Fugate has made some excellent original designs for reinforced-concrete fountains, which have drinking troughs for horses and cattle and smaller troughs for

the smaller animals, places for washerwomen to work, and a private bath at each fountain.

These fountains are located about 1 kilometer apart east and west of the municipality.

SAN FRANCISCO, CAMOTE ISLANDS.

A small gravity system has been completed in the municipality of San Francisco in the Camote Islands, Province of Cebu, under the direction of the district engineer, Mr. Claud Russell. The municipal officials of San Francisco voted to take a very material reduction in their salaries in order that the difference might be used for the construction of this water system, and agreed to accomplish by voluntary labor the receiving and storing of the material and the construction of the pipe line. The agreements made by the municipal officials and the people of San Francisco have been strictly carried out, resulting in great rejoicing on the part of all the people upon the completion of the water system.

ZAMBOAN, CEBU.

The municipality of Zamboan, Cebu Province, has recently appropriated several thousand pesos which have been augmented by a small Insular appropriation for the construction of a system which is less than 2 kilometers in length. The plans for this system have been approved and material ordered, and it is expected that construction work will commence during the coming month.

WATER-SUPPLY PROJECTS PENDING.

The plans for a new project, the construction of waterworks for the municipality of Pilar, Camote Islands, Province of Cebu, have lately been forwarded by the district engineer. The population to be supplied is about 1,000; the capacity of the spring is about 20 gallons per minute and the per capita supply is 28.8 gallons per twenty-four hours. The distance of the spring from the town is approximately 1,600 meters, with an elevation of 42 meters. The distribution system plan consists of 1 inch and 1½-inch pipes and the estimated cost of the project is P12,480. The municipality has requested a loan from the gold-reserve fund in order to assist it in this work.

Another project is the construction of a watersupply system in the municipality of Carcar, Province of Cebu, to supply a population of 5,000. The capacity of the spring is 28 gallons per minute and the distance of the spring from the town is 3,100 meters, with an elevation of 18 meters. The plan calls for a circular reinforced concrete covered storage tank having an inside diameter of 5.6 meters with an elevation of 2.8 meters. This tank provides for a storage of 13,400 gallons from the night run-off of the spring. The main pipe line from the storage tank to the town is made up of 3½inch pipe capable of delivering 60 gallons per minute into a distribution system composed of 1½-inch and 3-inch pipes. The estimated cost of the completed work is P20,000, and the municipality has requested a loan from the gold-reserve fund to execute this work.

The municipality of Naga, Cebu Province, has requested the district engineer to investigate and prepare plans for a water-supply system. These plans have just been submitted to the Director of Public Works for approval. The population to be supplied is approximately 5,000. Two springs, 1,200 meters apart, have been connected and the discharge is through a 1½-inch pipe line 300 meters long into a circular reinforced concrete covered storage tank of 5 meters inside diameter and 2.8 meters in height, capable of receiving 13,000 gallons during the night. The elevation of these springs is 77 meters above the town. The main pipe line consists of a 2-inch pipe which is 1,430 meters in length; distribution system of 1½-inch pipe. The estimated cost of the system is P9,000 and the municipality has requested a loan from the gold-reserve fund for the execution of the work.

Another project in Cebu Province is the Tudela water-supply system. The municipality of Tudela in Camote Islands is isolated on a small island 30 miles from Cebu, and the success of the San Francisco water system in the same group of islands has encouraged them to request a similar supply. The source of the supply is a spring 1,700 meters from the municipality, with an elevation of 155 meters. The discharge of this spring is 23 gallons per minute. As wrought-iron pipe should not be subjected to a pressure of 100 pounds per square inch, it was decided best to construct a small distribution tank near the town, with a sufficient head to give all the necessary pressure for the distribution system of 1½-inch pipe line, without valves so that no heavy pressure would result in the line. The estimated cost of the system is P4,500 and the municipality has requested a loan from the gold-reserve fund for this project.

The municipality of Sibonga, Province of Cebu, has also requested a loan from the gold-reserve fund for the construction of gravity water system. The population to be supplied is estimated at 6,000. The spring from which this supply is to be secured is 4,300 meters from the town, at an elevation of 99 meters, and has a flow of approximately 44 gallons per minute. The plans call for a circular reinforced concrete covered storage tank. From the spring a 3-inch pipe will deliver water into Sibonga through a 2½-inch and 1½-inch distribution system. One hydrant will always be kept open in the municipality to cut down the pressure on the main pipe line. The estimated cost of this project is P20,000.

The district engineer of Cebu has also submitted plans for the construction of a water system in the municipality of Argao, Province of Cebu. This system is very similar to the design of the system for Carcar and Sibonga, described above. The main spring is 4,700 meters from the town; the main pipe line is 3,600 meters long and consists of 2½-inch wrought-iron pipe discharging into a 2-inch and 1½-inch distribution system. The storage tank will have a capacity of 9,600 gallons. The estimated cost of this project is P20,000. A loan has been requested by the municipality to execute the work.

The district engineer has also submitted plans for a water system for the municipality of Catmon, Province of Cebu. The spring is located 1,700 meters from the town at an elevation of 42 meters. It has a flow of 25 gallons per minute. A circular reinforced concrete covered storage tank of 15,000 gallons capacity will be located near the spring. The main pipe line will consist of 2½-inch wrought-iron pipe and the distribution line will be a 1½-inch pipe. The population to be supplied is estimated at 1,500, and the estimated cost of system is P6,650. The municipality has requested a loan from the gold-reserve fund for the construction of this system.

The construction of municipal water-supply systems is doing more than any other one thing toward bringing the municipal authorities and district engineers together in the performance of public works in the various provinces.

REBUILDING HANKOW

On the principle that it is a wise thing to make good come out of evil the people of Hankow are said to have decided that the new city that is to arise from the ashes of the Hankow that sank beneath the shock and flame of war shall be throughly up-to-date. With the foreign concessions as object lessons the local Chinese have perhaps realized that it is possible to live under conditions that render urban life infinitely more agreeable and better from a hygienic point of view. It was estimated that a sum of about G. $15,000,000 would be required to build a city with wide streets, an up-to-date Bund, electric street car lines and adequate public buildings. How to obtain this money was the problem, and still is the problem, more especially as the Central Government, itself hard pressed for funds, looked askance at any proposal from the provinces that they should make incursions into the loan market.

It has been reported, however, that the enterprising Robert Dollar Company had arranged a loan of from £3,000,000 to £4,000,000 sterling with the provincial authorities on the security of the provincial revenues. In addition to this a contract for woodblocking the principal streets of the new city had been secured for the Standard Lumber Company with which the Robert Dollar Co. is allied. The loan is to be devoted to the construction of a city up-to-date in every particular.

When the project of rebuilding first came up for serious consideration a Bureau of Reconstruction was appointed. This body was appointed by the military government and it carried on its operations without paying any attention at all to the property owners. As a matter of fact the majority of the property owners had fled while the fighting was going on and the Bureau started laying out their plans before they began to return. When the owners realized that disposition was being made of their property without consulting them they demanded that they should have some say in the matter. Representations were made to General Li Yuan-hung who ordered the owners and the Bureau to talk the matter over. This conference seems to have resulted in the Bureau forming itself into a kind of tribunal to decide upon questions raised by the owners. These were eight in number and the questions or demands and the answers are as follow:—

1. It is demanded that the Central Government shall go security for the loan, and that the Hankow taxes shall not be pledged for this purpose. Answer: Since the loan in question (the Robert Dollar loan) has been passed by the Advisory Council at Peking and duly sealed by the military government of Hupeh, there is nothing more to be said about it.

2. It is demanded that the width of the roads shall be reduced, and the big foot measure made smaller. Answer; The number and position of the new roads having now been finally fixed it would be exceedingly difficult to make any alteration, but, as to the breadth of them, this can be reduced at the time of construction by a common understanding.

3. It is demanded that the value of the properties shall be fixed by the owners in the various localities so that they shall not suffer loss, and that the registers of the former land office shall be accepted as the proof of area. Answer: As the value of the properties has already been fixed by the Bureau, it will be necessary to ask the Tutuh to appoint a committee of representatives of the owners, of the Chamber of Commerce and of the Bureau to deal with the question and to settle it on the lines of uniformity.

4. It is demanded that all the land required for road construction shall be paid for with ready money. Answer: All private property taken up will be paid for with ready money, or, if an owner objects to the amount, an equal area of land in a similar situation will be given him by the Bureau.

5. It is demanded that the unburned buildings at both ends of the town shall be left untouched. Where there are large buildings the new roads shall be carried round them, but smaller buildings may be removed on the payment of proper compensation. Answer: The buildings remaining at both ends of the town shall not be disturbed in the meantime, but when the new streets are built up to them then they must all come down. With respect to temples and guildhouses, where they are very large, an effort will be made to go round them, but, if this is not possible, compensation will be paid for their removal and re-erection on another site.

6. It is demanded that the property owners shall have a say in the amount of taxation which may be imposed. Answer: Taxation is a matter which concerns the Central Government and must pass the two houses of Parliament; the Bureau cannot take any responsibility with regard to this matter.

7. It is demanded that in the bunding of the river banks provision shall be made for the safety of boats and the convenience of traffic. Answer: The suitable bunding of the banks of both rivers so as to give the greatest facility for trade is a main object of the scheme; it ought not to be supposed that this has not been seen to.

8. It is demanded that, after the streets, lanes, paths and drains have been laid out, the people shall have authority to build their houses in any way they please. Answer: There is no civilized country where the people are allowed to build any kind of houses they please: this demand cannot be entertained.

REINFORCED CONCRETE TESTS

The rapidly increasing demand throughout the Far East for reinforced concrete in building and other construction uses, has led one of the leading American manufacturers of reinforcement steel, to detail a special engineer to cover this important field, and operate in conjunction with their various agents. The Trussed Concrete Steel Co., of Detroit, manufacturers of the well known Hy-Rib and other specialties, employed in the Kahn System of Reinforced Concrete, early recognized the possibilities of the Orient as a market for their products, and their pioneer work covering several years has largely contributed to the increased employment of this style of construction. Where other manufacturers have remained content with the occasional order through commission houses, leaving their agents to push the sale of their products, this enterprising American concern, has conducted a liberal propaganda by advertising judiciously in the engineering publications, and sending out special men to assist their agents, and by many public tests in the various ports. In a part of the world subjected to earthquakes and typhoons, where pestilence and plague, soon renders the ordinary wood, wattle, or brick construction, a focus for the spread of disease, the necessity for some cheap, strong and sanitary construction, is greater than in any other portion of the globe.

In the Philippines, the use of reinforced concrete for building construction has practically superseded wood and brick, and its use is speading rapidly in the Straits Settlements and Federated Malay States.

The Trussed Concrete Steel Company recently detailed the engineer of their London house, Mr. N. K. Fouguer, to cover the Far East and work in conjunction with their various agents in this field. In Singapore, Mr. Fouguer conducted three tests in the presence of the leading engineers of that port, which will prove of interest to our readers.

SLAB NO I.

The first test panel was constructed of a 2 inch Concrete Slab reinforced with 24 Guage 4 Rib Hy-Rib, resting on 14 inch Brickwalls; 5 ft. 0 inch clear span between supports. Walls were 4 ft. high, and the Slab had 6 inch bearing on top of each wall.

It was designed for a superimposed load of 112 lbs. per sq. ft. with a factor of safety equal to about 3½. (Tables in Hy-Rib Hand Book are based on Bending Mom. $\frac{WL}{10}$ *i.e.*, for continuous spans, and the factor of safety for such conditions equals 4.)

Concrete was mixed 1:2:4. *i.e.* one part Cement, two parts Sand and four parts ¾ ins. broken Granite.

The sand and stone were of excellent quality, the Cement was not tested, but looked well, judging from a superficial examination.

The width of test panel was 3 ft. 6 ins. while the actual clear span measured 5 ft. 0¾ in.

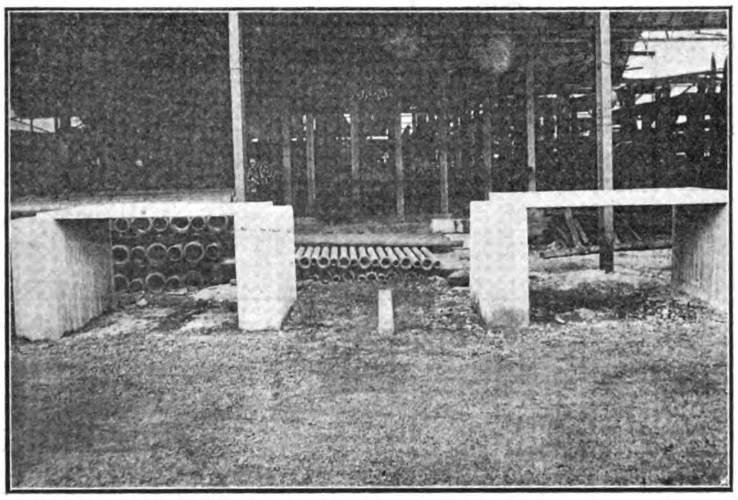
One half of underside of Slab was back plastered clear across the span, while Hy-Rib was left exposed in the other half to show construction.

The Slab was constructed on 18th March, and tested to destruction on the 27th April, 1912, having an age of 40 days.

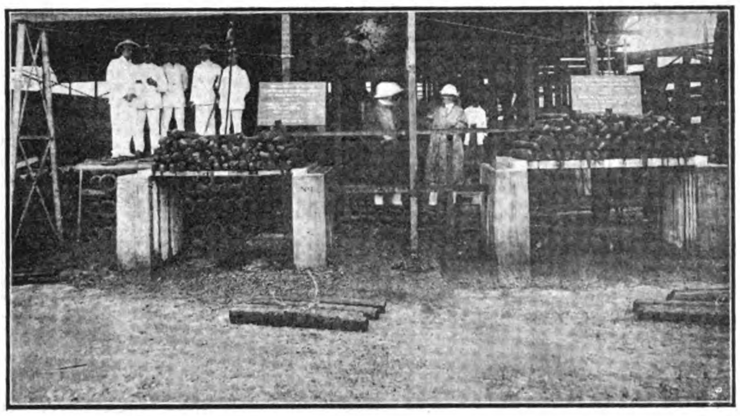
Ordinary Pig Iron was used for loading and was carefully weighed on scales immediately before being placed on test panel.

The following tabulated results give full information about the loads and corresponding deflections.

It will be noticed from the table that the slab carried more than 5½ *times the superinposed load for which it was designed* with a



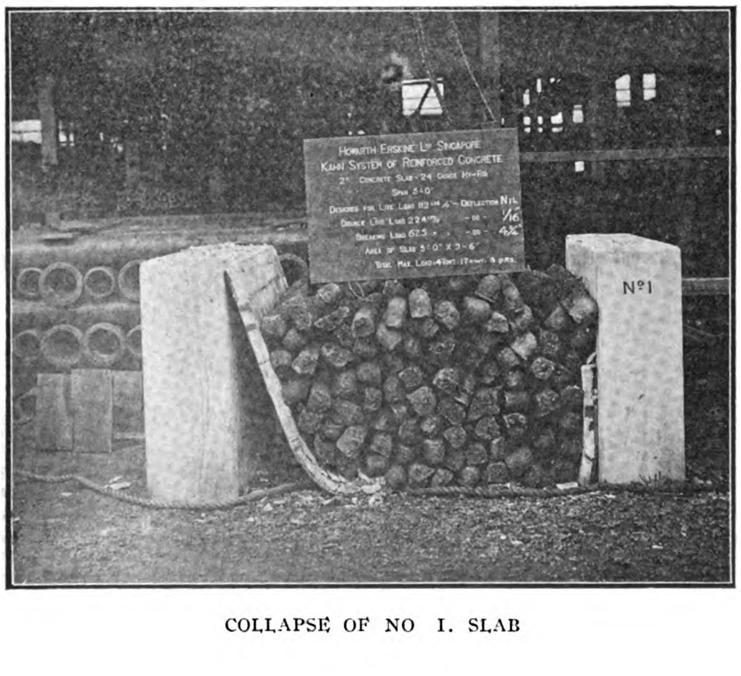
CONCRETE SLABS READY FOR TESTING



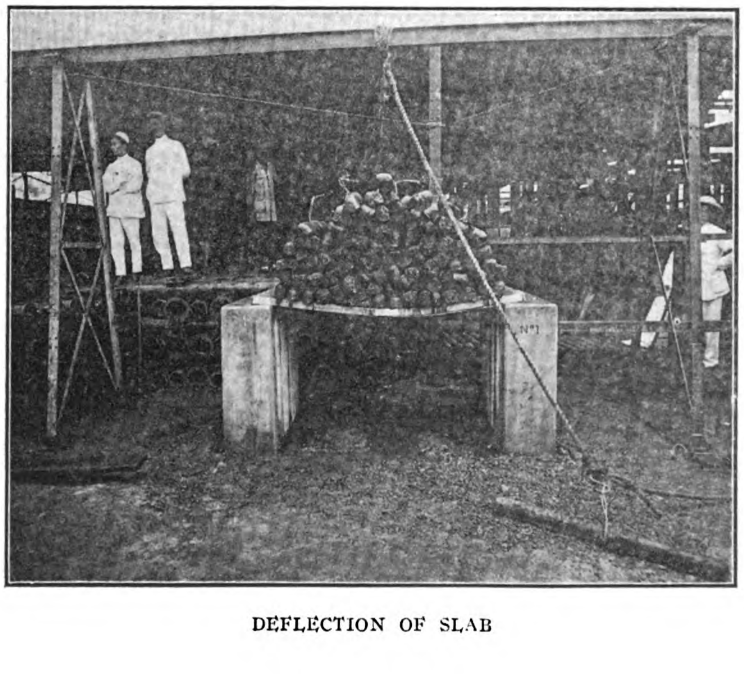
LOADING SLABS WITH PIG IRON

LOADS APPLIED TO TEST SLAB NO. 1—5 FT. 0 IN. × 3 FT. 6 IN. × 2 IN.

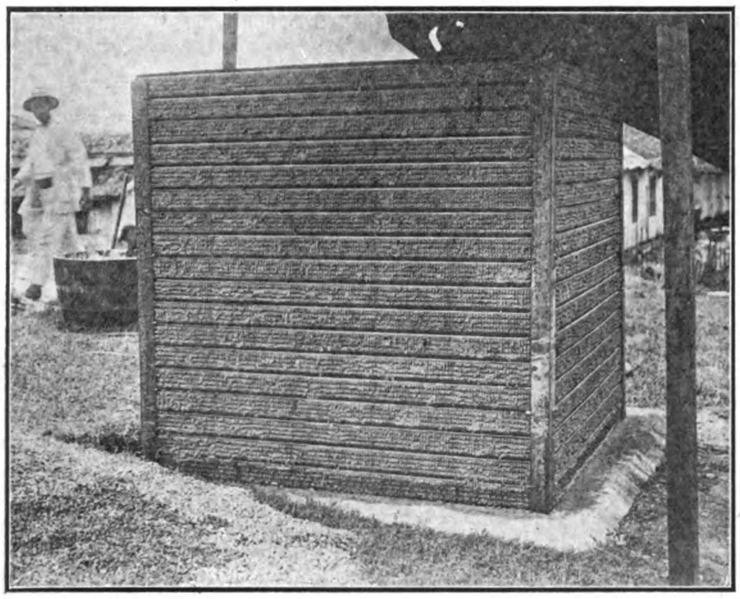
No.	Loads.	Weight			Deflections.	Load per Sq. Ft.	Remarks
		cwt.	qrs.	lbs.			
1st	Pig Iron.	17	2	20	Nil.	113.1	
2nd	,,	17	2	15	1/16"	226.2	Slight fracture at one end
3rd	,,	8	3	04	⅛"	282.23	
4th	,,	8	1	04	/32"	335.26	4 cracks in centre in plastering on underside.
5th	,,	8	0	19	⅜"	384.11	
6th	,,	7	1	13	⅞"	434.45	Cracks extended to edge of slab.
7th	,,	6	2	06	1⅛"	476.40	
8th	,,	3	2	05	--	499.09	
9th	,,	4	1	11	2⅛"	526.90	
10th	,,	3	3	14	--	551.70	
11th	,,	2	1	--	2⅜"	565.70	
12th	,,	4	2	12	3½"	595.82	
13th	,,	4	2	12	4¾"	625.30	Total collapse.
Total Weight		97	2	23			

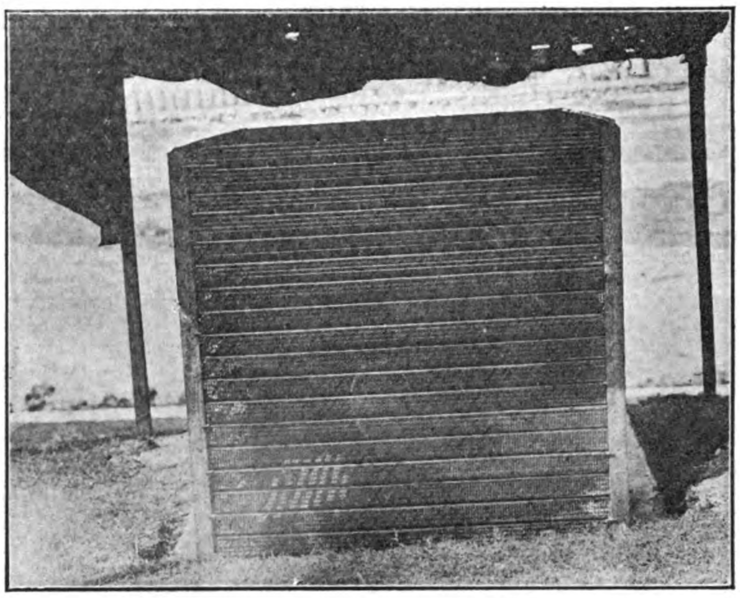


COLLAPSE OF NO I. SLAB



DEFLECTION OF SLAB





TEST TANK, 5×5×5 FEET, WALLS 3 INCHES THICK, CONSTRUCTED OF HY-RIB METAL

total deflection of 4¾ *inches* in the centre just before the moment of collapse, and this result is considered extremely satisfactory from every point of view.

The final collapse was caused by the concrete failing in compression, which is clearly proved by an examination of the broken slab.

At the time of the last deflection reading, the Hy-Rib resisted a tensile strain of about 90,000 *lbs. per sq. inch* which is fully thirty per cent. better than the ultimate strength generally specified for steel reinforcement.

The ultimate compressive strength on extreme fibre of concrete just before failure, was about 4,200 lbs. per sq. inch, which is also a very excellent result.

The cement used was: "Red Hand Brand"; and the Slab was kept thoroughly wet and covered up for 8 days after being made.

The above results were obtained by using local materials and native labour in connection with the Kahn System Hy-Rib, and it will readily be seen that Reinforced Concrete can be made fully as strong and reliable in this Country as anywhere else, if the proper care is taken in the construction.

Loading of Slab started at 2.45 p.m. and collapse occurred about 4.45 p.m.

The numerous photographs taken illustrate the test fully, and it will be noticed on these that cracks have been marked on Slab with a piece of chalk in order to make them more noticeable.

SLAB NO. 2.

This Slab was designed for a superimposed load of 224 lbs. per sq. ft. and constructed of 3½" Concrete Slab reinforced with 24 Guage 4 Rib Hy-Rib, resting on 14" Brickwalls 4 ft. high.

The clear span was 6' 0" and the Slab had 6 inch bearing on each wall. Concrete was mixed 1:2:4, and conditions were very similar to Slab No. 1.

Width of Slab was 3' 6", and half of underside was back plastered across entire span, while in the other half, Hy-Rib was left exposed for inspection.

Slab No. 2 was constructed on 16th March and tested on 27th April, 1912. The intention was to load it up to destruction, but from the experience with No. 1 it could be readily seen that special arrangements would have to be made in order to accomplish this; and it is doubtful if it would have been possible to break the slab by loading with Pig Iron, unless special platform with cantilevers out on both sides of slab had been made to receive the load, and a cradle had been provided to prevent the Iron from falling off.

As it was getting dark and the spectators were highly satisfied with the results from Slab No. 1, it was decided to load Slab No. 2 with the double load and observe deflections.

At a superimposed load of 224 lbs. per sq. ft. the deflection in centre of span was $\frac{1}{32}$". When the load was doubled, making a total superimposed load over the centre of the slab equal to 448 lbs. per sq. ft., the deflection was $\frac{3}{16}$". This double load was left on Slab for 3 days, and, on removing the Pig Iron on the 30th April, the Slab went back to its original position, leaving a permanent set of less than $\frac{1}{16}$". It was raining very heavily during both tests of slabs.

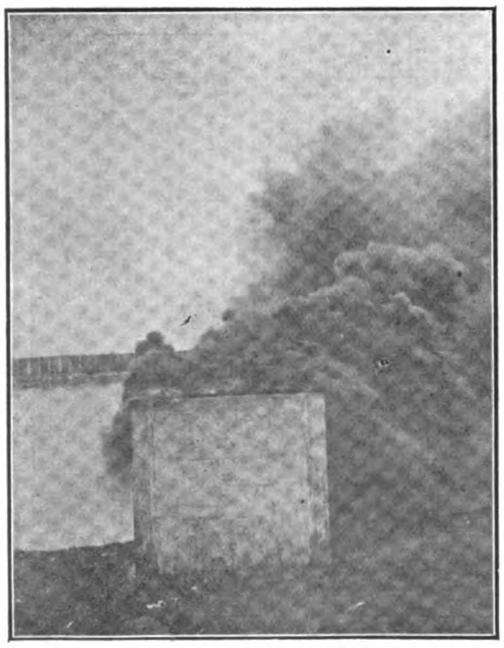
As will be noticed from the photographs the loads were gradually getting more and more towards the centre of spans, and this of course tended to increase the bending moments very considerably.

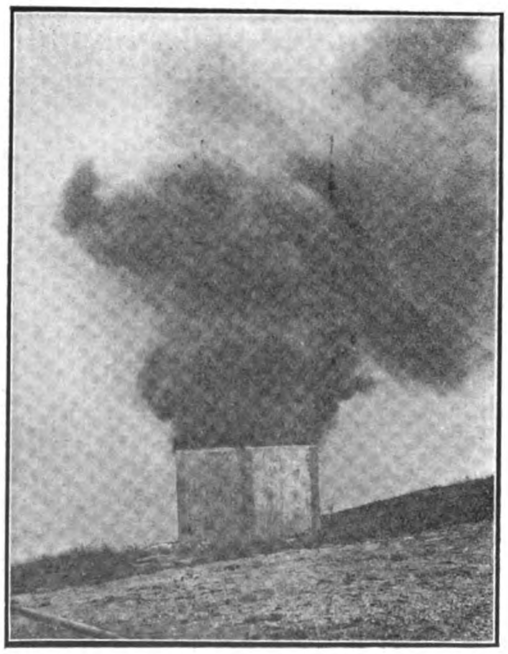
No arch-action was possible in the way the Pig Iron was placed, and it was agreed that both tests were fair and proper in every way.

TANK.

The test tank was 5 x 5 x 5 ft. inside dimensions, walls were 3 ins. thick, plastered on 24 Guage 4 Rib Hy-Rib which was run horizontally.

In each corner was placed vertically one 2¾ × 2¾ × ⅜ in. steel angle to which Hy-Rib was attached by clips and wiring. The bottom was about 2" thick on top of the 24 Guage 4 Rib Hy-Rib, and a 6 inch ordinary Concrete Foundation Slab carried the Tank.





PHOTOS OF TANK UNDER FIRE TEST, AND THE TANK AFTER COMPLETION OF TESTS

The last plastering coat was put on and the tank completed on 2nd April, and the water and fire test took place on the 1st May giving an age of only 29 days. Water had been filled in tank for two weeks before test i.e., when it was only two weeks old.

The mortar plastering was made up of—5 parts Cement; 12 parts Sand; 1 part Limepaste. 1 part Trus Con Waterproofing Paste was mixed (to every 12 parts of water used) to make the Tank watertight.

The first test was started at 8.30 a.m., 1st of May, when a thorough inspection by the Engineers and Architects present proved that it was absolutely watertight without any leaks whatever.

The water had remained in tank for two weeks, causing a pressure on sides near bottom of about 300 lbs. per sq. ft.

The tank was now rapidly emptied by means of a syphon and a reading was taken with a transit on the centre point of one side, but no deflection whatever had occurred from the water pressure.

One hundred and sixty gallons of kerosine oil was now poured in, and at 9.15 a.m. this was put on fire. In a moment the flames rose high above the Tank, which from thence resembled a roaring furnace and the heat was terrific. Horizontal readings of the deflections of one side were taken by means of a transit and gave the following results:—

TIME.	*Deflections in Centre Point of Side.*
Oil Fire Burning 10 Min.	$\frac{1}{16}$ ins.
" " " 16 "	$\frac{1}{16}$ "
" " " 45 "	$\frac{1}{16}$ "
" " " 1 Hour	$\frac{1}{8}$ "
" " " 2 Hours	$\frac{3}{16}$ "
" " " $2\frac{3}{4}$ "	$\frac{5}{8}$ "

The oil was all consumed and fire ceased at 12 noon, after a continuous blaze of $2\frac{3}{4}$ hours.

Horizontal cracks started to appear after about 15 minutes, and small explosions were heard, but *during the entire Fire, neither Oil nor flames penetrated the walls*, and the Hy-Rib construction certainly proved a highly effective type of fireproof material, which should win the approval of all building Authorities in the East as it has already done in other countries.

At 12.30 p.m. a firehose was played on the sides to cool the tank and it was filled with water up to 18″ below the top, while still very warm.

Naturally the water leaked out of some of the cracks, but otherwise the walls still maintained strength and elasticity enough to resist the water-pressure.

Considering that the Tank had contained water for 2 weeks and that enormous heat was immediately applied to the damp surface, after water had been siphoned out, the test was an extremely severe one and proved definitely the Kahn System's claims for a Fireproof, Oilproof and Waterproof Construction.

The Hy-Rib Reinforcement was not damaged *in any way*, and the outsides of Tank looked perfectly well with the exceptions of the cracks.

The level of Oil in Tank when fire started was about 12 inches from the bottom.

Slight repairs have since been made to the plaster and the Tank filled with water, the result being that it still continues to be watertight and is ready to again demonstrate its ability to withstand an equally severe fire test.

DEFIANCE HUB TURNING MACHINE

DEFIANCE MACHINE WORKS

The No. 1 Patent Automatic Hub Turning Machine illustrated herewith, is the largest and most powerful machine of its class, designed especially for making carriage and wagon hubs of different sizes and shapes up to 18″ diameter, 18″ long at the largest, having a capacity for finishing 600 heavy hardwood hubs in ten hours, or roughing out 2,500 blocks.

This Machine receives the block in its rough state, performs the roughing, turning, cupping, finishing the ends, cutting beads and shoulders for bands, making hubs any shape or size complete at one operation more uniform and perfect and at an immense saving over hand turning.

The Frame of this machine is composed of iron, a massive casting in one piece, of neat design and of sufficient weight to stand firm and perform the heaviest turning without jar or injury to the working parts.

The Carriage is built in two parts. The lower half is gibbed and fitted to the frame in angular ways, with adjustment horizontally in line with the mandrel by hand-wheel and screw to center the knives with the turning. The upper table with the roughing and finishing knives attached at either end is mounted upon and gibbed to the lower table, and it slides from right to left at right angle with the mandrel by turning the large hand-wheel to bring either the roughing or the finishing knives up to the work to be turned.

The Roughing Knife is 18″ long and it is held in a stand at the back end of the sliding carriage with its cutting edge extending downward, and when in operation removes the surplus material from the hub block in the form of a veneer or ribbon ⅛″ thick, full length of hub, at one cut, requiring no adjustment for length or diameter of block. A gauge governs the depth of cut and the amount of feed.

The Patent Finishing Knives are located at the opposite end of the carriage from the rougher knife, with their cutting edges extending upward, consisting of a body knife with cutting edge shaped to correspond with the style of hub to be turned, and flat knives at either end for cutting the band seats and cutting off the hub to the proper length.

The Cupping Attachment is gibbed to the tail stock and provided with a gauge to regulate the depth of cut. The shape of knife governs the style of cup. A special back cupping attachment can be furnished when so ordered, which attaches to the carriage of the machine.

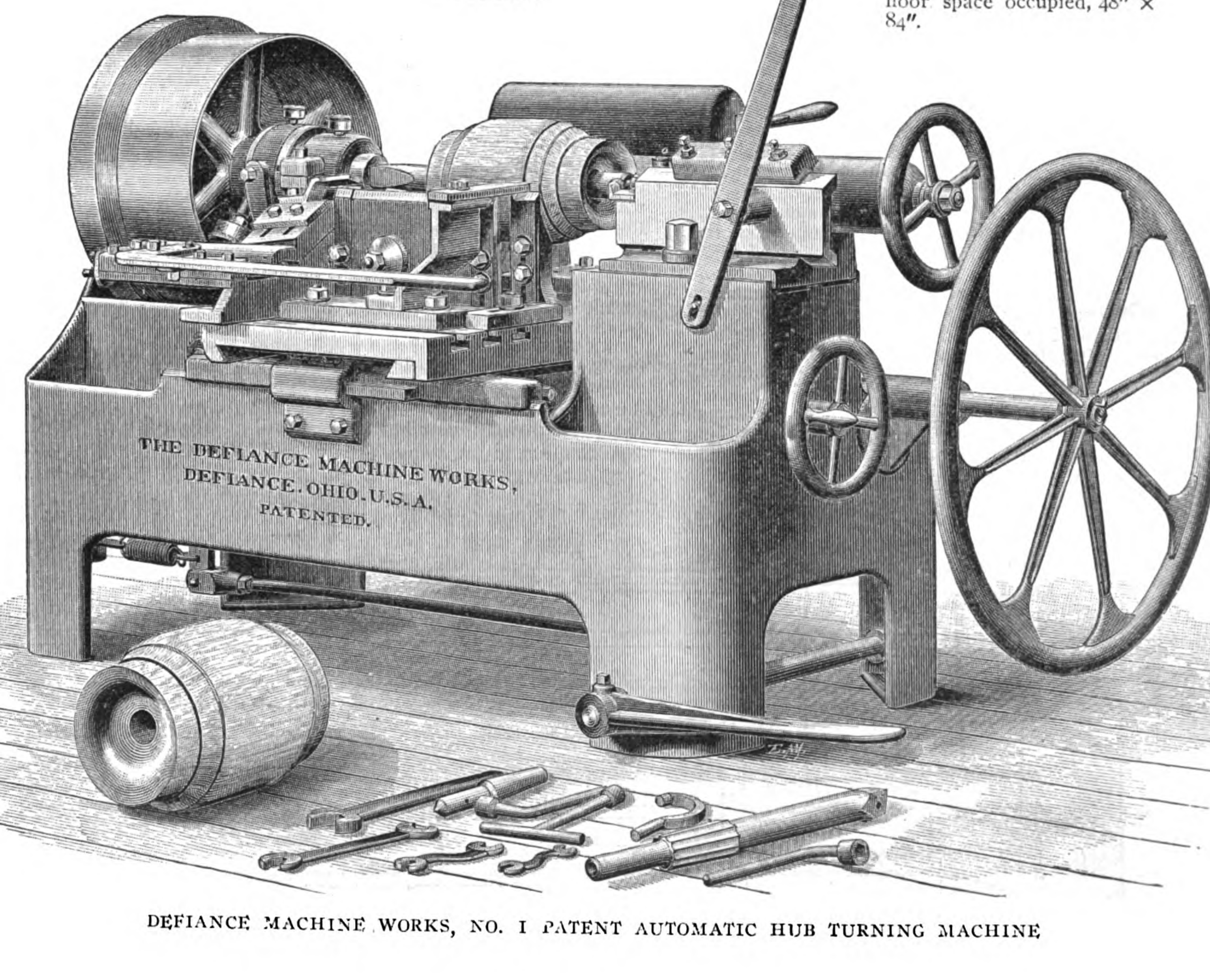
A Powerful Friction Clutch, fitted upon a 3″ steel spindle driven by an 8″ belt, communicates power to revolve the hub. The frictions are engaged or disengaged by a convenient foot treadle. A single movement of the operator's foot upon the treadle instantly starts or stops the machine without changing the position of the operator or shifting the belt.

The Operator has complete control over the machine from the working side. As the material to be operated upon revolves, the roughing knife is first presented to its action by turning the large hand-wheel to the left, reducing the hub block to the proper diameter for the finishing knives. By a reverse movement, the roughing knife retreats, and the finishing knives which shape the hub to the desired form and length are brought into service. The diameter of turning is regulated with graduating screws attached to the carriage, and when once adjusted for hubs of one diameter no further adjustment is required, and all hubs will be turned to exact size and shape at one starting and stopping of the machine.

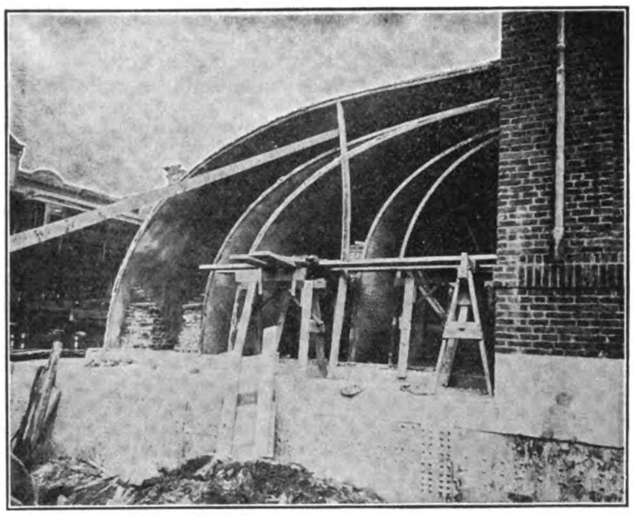
The Countershaft is $2\frac{7}{16}$″ diameter, 56″ long; two No. 3 hangers, 28″ drop; one belt shifting apparatus, complete; one driving pulley, 40″ × 8″; tight and loose pulleys, 20″ × 8″; speed, 400 rotations per minute.

Friction Pulley on machine, 20″ × 8″; speed, 800 rotations per minute.

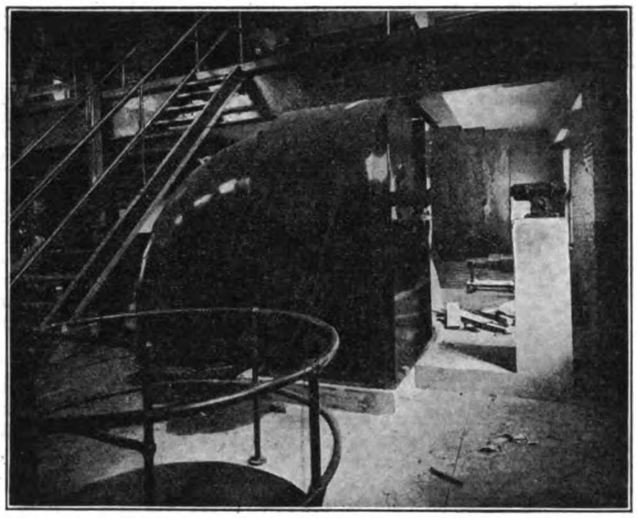
Horse Power to drive, 6; floor space occupied, 48″ × 84″.



DEFIANCE MACHINE WORKS, NO. 1 PATENT AUTOMATIC HUB TURNING MACHINE



DISCHARGE DUCTS ON NO. 12 DOUBLE INLET PRESSURE FAN (UNDER CONSTRUCTION)



NO. 11 "SIROCCO" EXHAUST FAN

VENTILATION OF THE PENNSYLVANIA TUNNELS AT NEW YORK CITY

BY B. W. BENNETT, M.E.

At the time of the building of the new Pennsylvania Railroad terminal at New York City, the ventilation of the fifteen and a half miles of tunnels leading from the station at Seventh Avenue and Thirty-third Street under the Hudson River to Hackensack, New Jersey, and under the East River to Long Island City, and running the full width of Manhattan Island, under the city, was considered a matter of prime importance.

In the design of such a ventilating system, two main factors had to be considered. First, it was absolutely necessary that sufficient ventilation be supplied to make the tunnels safe under all emergency conditions, and second, it was highly desirable that such a standard of purity be maintained, that passengers should suffer no discomfiture during times of normal operation, due allowance being made for occasional irregular spacing of trains. In order to obtain these results, it was decided to maintain a standard of purity in the cars of not more than eight parts of carbon dioxide in ten thousand parts of air. This was equivalent to supplying thirty cubic feet of air per minute to each passenger, and in the case of the tunnels under the East River was equal to approximately a twenty minute air change. To insure that the full amount of air desired be supplied to the occupants of the cars, it was decided to deliver to the tunnels fifty cubic feet of air per minute per person, or two-thirds more than was actually required to maintain the desired standard of purity.

The first and most important feature to be considered, with respect to the ventilating system, was the general lay out or scheme and various systems for obtaining the requisite ventilation by exhaust, by pressure and by a combination of both were considered. After due consideration, the system found to be best adapted to local conditions was a forced draft system of the same kind as used for ventilating a number of railroad tunnels going through the mountains. In this system, the air is introduced in a stream of constant flow, through a divided nozzle which delivers it on each side of the tunnel through evase or expanding outlets, placed in the bench walls. In every case these outlets direct the flow of the air stream in the direction of traffic in the various tubes or tunnels. After the installation, it was found by test that a decided injector effect was obtained by the use of these special outlets. This effect was so pronounced in the case of the North tunnel under the Hudson River, that a strong current of air was induced, which flowed from the East entrance of the tunnel toward the fan, which is placed about seven hundred and fifty feet from this entrance and blows toward the West end of the tunnel.

A further advantage obtained by the use of the system described above is the absence of obstructing duct work in the tunnels, thus leaving the side benches entirely free for walkways. The ducts leading from the fans to the various nozzles were designed in each case to suit local conditions, particular attention being paid to the elimination of sharp bends, which would result in losses due to friction. Care was also taken that there should be no abrupt changes in cross section in these ducts, as such changes would result in sudden changes in the velocity of the air and a consequent loss due to conversion and eddy currents. The accompanying photograph of these ducts, taken during erection, illustrates the great care given to this part of the installation.

A diagram of the tunnel lay out and of the ventilating system is shown in Fig. 1. The upper diagram shows the lay out of the system extending from Hackensack to the terminal area, and the lower diagram the lay out of the system extending from the terminal area Long Island City. The direction of the flow of the air from the various fans is indicated by arrows. In each case this is in the direction of traffic in the individual tunnels. The tunnels are so constructed that each tube is entirely separated from the others, thus preventing the by-passing of air between the tubes, which condition has proven so detrimental in the case of the subways in London and in other notable cases.

After the volumes of air required for the various sections of tunnel had been determined by the engineers of the Pennsylvania Tunnel and Terminal Company, the plans of the tunnels, shafts and fan houses were sent to the fan manufacturers with a request for recommendations and proposals for the fans to deliver the required volumes through the various systems as indicated on the plans. There are fourteen fans in all, twelve of which are used as supply fans. The other two fans which are located at First Avenue are exhausters and draw the air from the terminal area through the South tunnels under Thirty-third and Thirty-fourth Streets. These fans were so arranged in order to prevent the vitiated air from the North tunnels under these streets from being blown up into the station proper. The two accompanying photographs show a typical double inlet supply fan and one of the exhaust fans.

The fans used are "Sirocco" fans, and are particularly adapted to this work due to the relatively small space as occupied by a fan for a given volume and due to their high efficiency. These fans have wheels of the multiblade, drum type. Some of the fans are double inlet fans while others are of the single inlet type. The type used at each location is given the table of test results below. The fans are all belted

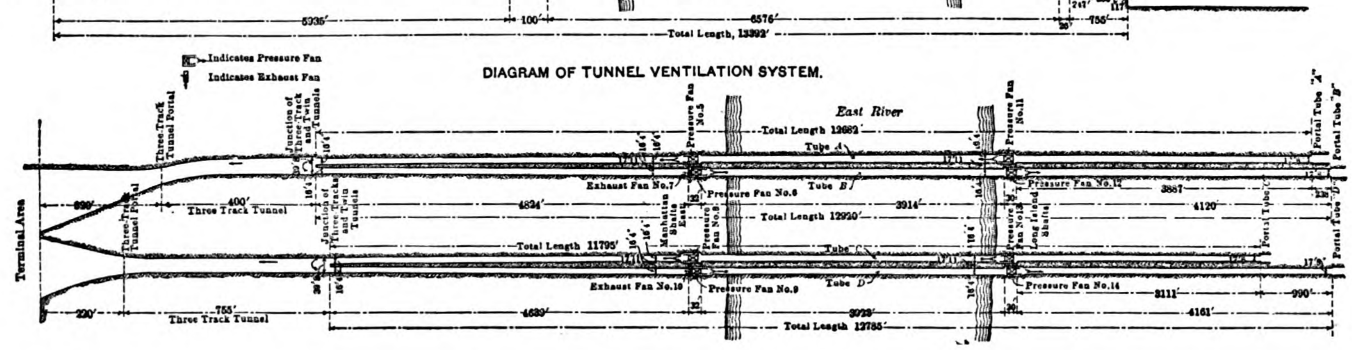


DIAGRAM OF TUNNEL VENTILATION SYSTEM.

to induction motors and are equipped with three step cone pulleys, by which speeds of 70% and 40% of the maximum can be obtained.

After the installation was completed, tests of all the fans were made by the engineers of The Pennsylvania Tunnel and Terminal Company and of The American Blower Company. A tabulation of the results obtained is given below, together with a list of the location of the various fans.

Anemometer tests in the tunnels showed that the average air velocity due to the operation of the fans alone was about eight miles an hour, but this is increased to as high as thirty miles an hour due to the piston action of the trains.

TEST RESULTS—PENNSYLVANIA TUNNELS FANS.

LOCATION.	Fan No.	Blower or Exhauster	Direction of Air	Diam. Wheel in Inches.	Approximate length of tunnel ventilated, in feet	Fan capacity at normal speed, in cubic feet per minute.	Velocity at fan outlet, in feet per minute.	Brake Horse Power at Motor.
North River—Hackensack Portal. Building over Portal..............	1	B	E	60	5,900	87,000	3,920	48.6
North River, Weehawken Shaft, in room between	2	B	E	60	6,600	125,800	5,670	97.0
Tracks below bench level	3	B	W	54	6,000	100,800	5,586	56.8
North River Eleventh Av. Shaft, in room at track level on north side of west bound tube	4	B	W	60	6,600	107,000	4,330	68.5
East River—First Av. Shafts, in building located	5	B	W	72	4,800	100,000	3,130	62.0
At ground level over tracks	6	B	E	54	3,900	60,000	3,330	21.0
3 and 4	7	E	E	66	4,800	59,200	4,400	27.9

TEST RESULTS—PENNSYLVANIA TUNNELS FANS.—(*Continued.*)

LOCATION.	Fan No.	Blower or Exhauster	Direction of Air	Diam. Wheel in Inches.	Approximate length of tunnel ventilated, in feet	Fan capacity at normal speed, in cubic feet per minute.	Velocity at fan outlet, in feet per minute.	Brake Horse Power at Motor.
East River—First Av. Shafts, ...	8	B	W	72	4,800	100,000	3,130	62.0
In buflding located at ground	9	B	E	54	3,900	60,000	3,330	21.0
Level over tracks 1 and 2..............	10	E	E	66	4,800	59,200	4,400	27.9
East River—Long Island City Shafts, in building located at ground level over tracks 3	11	B	W	54	3,900	65,000	3,600	24.3
and 4	12	B	E	54	4,100	65,000	3,600	24.3
East River—Long Island City Shafts, in building located at ground level over tracks......	13	B	W	54	3,900	65,000	3,600	24.3
1 and 2	14	B	E	54	4,200	65,000	3,600	24.3

SEWERAGE SYSTEM FOR HAVANA, CUBA

Henry R. Worthington, 115 Broadway, New York, have just forwarded to Havana, through the Cuban Engineering & Contracting Company, the well-known contractors who have in charge the sanitization of the city of Havana, three of the largest pumping units ever exported from the United States for such service.

Each of these units consist of a 36″ special Worthington vertical shaft, double suction impeller, volute, centrifugal pump, with equipment of shafting, couplings, bearings, etc.

Each pump has a capacity of 46,000,000 gallons per 24 hours, and is arranged for connection to 42″ suction pipes and 36″ discharge pipes.

Each of these machines will be operated by a 240 kw. General Electric vertical motor, direct connection being made between the hydraulic and electric rotors.

Included with these three units will be all necessary accumulators. triplex and centrifugal oil pumps, with motors, complete oil feed and oil filter systems, special electrical controlling devices, etc.

These equipments will be placed in a station located at Casa Blanca, across the Bay from Havana City.

All the sewerage from the City will be delivered to this station through tunnels underneath the harbor and the mammoth pumps described will then force the same across the ridge back of Casa Blanca and far out to sea.

The pumps in question were designed and manufactured under the direction of the ablest and most expert hydraulic engineers and, undoubtedly, represent the highest grade ever reached in the production of this class of machinery.

All details of the machines were subjected to the closest scrutiny throughout the entire period of their manufacture, especial attention being given to the matter of high efficiency.

LIMA LOCOMOTIVE CORPORATION

The Lima Locomotive Corporation has sold to Redmond & Co. the entire issue of $2,000,000 first mortgage 5% 20-year sinking fund gold bonds, callable in all or in part at 110 on any interest date.

Proceeds will be used for the erection of additional buildings, purchase of equipment, and for working capital. The new plant will provide employment for 4,000 men.

This company, recently organized, has taken over the Lima Locomotive & Machine Co. For many years the latter company manufactured only geared locomotives, but during the past ten years steadily increased its output of railroad locomotives of all classes until further extensions have become necessary. The new corporation owns 43 acres of land at Lima, Ohio, on which there is a modern plant having a capacity of 400 engines per annum. This capacity will be increased to 900 or 1,000 locomotives a year.

Net earnings for the past seven years, after deductions for depreciation, have averaged 2½ times the interest on the new bonds.

The directors are A. L. White, Ira P. Carnes, W. T. Agerter, G. L. Wall, O. J. Thomen (of Redmond & Co.) and Merle Middleton. The company will be under the management of the same official staff as heretofore, A. L. White, President, G. L. Wall, Vice-President, W. T. Agerter, Secretary and Treasurer, Merle Middleton, Chairman of the board.

CYCLONE PROOF CONSTRUCTION

The following letter presents a *new* advantage of reinforced concrete construction:—

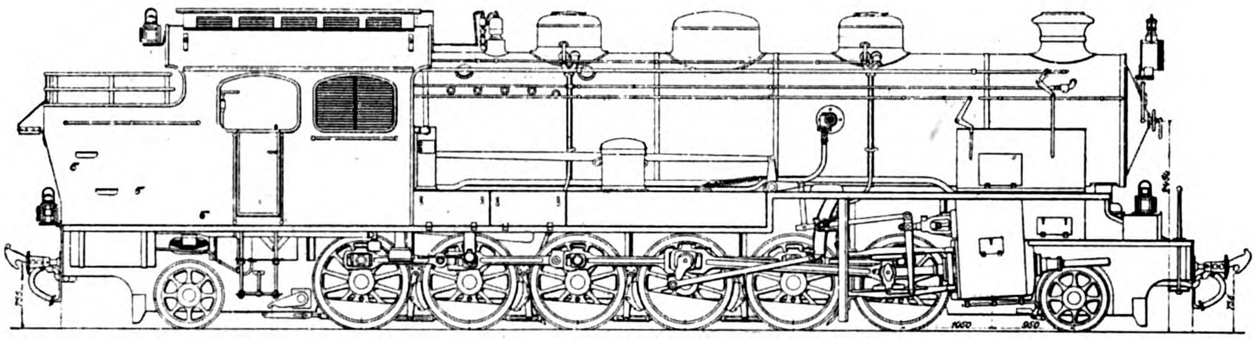
"REGINA," SASK,
July 2nd, 1912.

"The recent cyclone in Regina has shown up very plainly the advantages of Kahn System buildings, especially in the case of the Regina College, which was practically in the heart of the storm. The partitions of this building were entirely removed, but the reinforced concrete skeleton remained exactly in place. The representative of Brown and Vallance, Montreal, has written to his head office explaining this. He is particularly impressed with the fact that the Kahn System has given them a building which, in addition to being fireproof, is absolutely cyclone-proof."

Respectfully yours,
"Signed R. E. W. HAGARTY."

OIL IN PAPUA

The ever growing employment of petroleum as a fuel renders the discovery of a new source of supply of world wide importance. It has long been known that petroleum was to be found in New Zealand and wells within the last few years have been brought into operation. So far however in Australia no reservoirs of any commercial value have been found (although shale oil is worked) but in the dependency of Papua (British new Guinea) an immense petroleum field was discovered in May last. An expedition was sent out by the Papuan Government to report on the Hikori-Purari coalfield. The coal proved to be of little value, but an oil-field was found of immense extent and describing as possessing big possibilities. An expert is to be sent up to the field in December to test the field. Should the discovery prove to be as valuable as the report suggests competitor to the Borneo fields may be brought into existence.



"JAVANIC" TYPE LOCOMOTIVE

"JAVANIC" TYPE LOCOMOTIVE FOR THE DUTCH STATE RAILWAYS, JAVA

BUILT BY THE HANNOVERSCHE MASCHINENBAU A.G. (FORMERLY GEORG EGESTORFF)

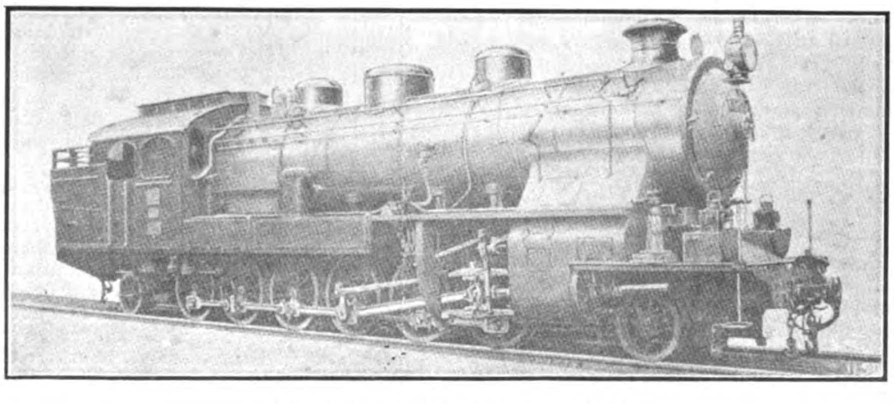
Gauge	3′ 6″
Diameter of cylinders	21¼″
Stroke of pistons	20 1/16″
Diameter of driving wheels	3′ 7⅜″
Diameter of leading and trailing wheels	2′ 6½″
Wheelbase	12′ 3⅝″—33′ 7 9/16″
Boiler pressure	171 lbs./sq.″
Grate area	28 sq. ft.
Heating surface measured to outside, superh.	390 „ „
Heating surface measured to outside, total	1800 „ „
Water capacity	1870 Imp. g.
Coal capacity	3 tons
Weight empty	127 000 lbs.
Adhesive weight	125 700 „
Weight in working order	164 500 „

Firebox, copper
Iron boiler tubes
Schmidt's smoke-tube superheater
Marcotty's smoke-combustion
Hardy's vacuum brake
Riggenbach's steam repression brake
Gresham's steam sanding device
Adjustable blast pipe
Haushälter's speed Indicator

Radius of sharpest curve	7 chains
Tractive force (norm.)	22050 lbs.
„ „ (maxim.)	27550 „

Code word: Javanic.

The arrangement of the axles of the 2-12-2 locomotive shown in the illustration a type of engine created by the Hannover Locomotive Works for the Dutch State Railways, Java, has been designated by the name "Javanic." The facility with which this twelve coupler, the four middle axles of which have no side-play, negotiates curves, is obtained by simple means, viz. by a leading and trailing axle of the "Adams" radial type, and by giving side-play to the first and sixth coupled axle after the Gölsdorf system, which latter offers the following advantages over other systems for allowing locomotives easily taking curves: Maximum of simplicity; uniform, undivided driving gear, consequently greatest security against slipping of the wheels; safe supporting of the boiler; short steam-pipe connections; simple driving gear and obviation of flexible steam pipes and of complicated articulations or cogged wheels. The wheel base is exactly symmetrical to the vertical centre plane, so that the locomotive can run equally well in both directions. The arrangement of the water tanks of the engine is also worthy of attention, in as much as they are opposed to the usual tanks placed at both sides of the boiler, placed between the frame plates and project at the sides beyond the latter, thus having a T-shaped cross section. This arrangement is particularly important in that it enables the side-sheet-stays to be readily got at at all times, and insures the accessibility of all parts of the boiler, so that it could be placed relatively high above the top of the rails, without the centre of gravity of the whole locomotive being raised. The elimination of the water tanks at the sides of the boiler is also of importance, in as much as the driver has thus an unimpeded view along the line in front of him.



"JAVANIC" TYPE LOCOMOTIVE

AGRICULTURAL MACHINERY

Siberia, a Market.—According to the *Peking and Tientsin Times* there is "a great market in Siberia for agricultural machinery of a type that answers local requirements . . . The pushful and enterprising American has managed to capture the cream of the market. There is a quick and ready market to supply horse ploughs for two, three, four, and six horses. Also for traction ploughs capable of being worked by the crude oils of the country . . . The local conditions for payments for machinery for agricultural purposes are one-third cash down, one-third during the following Autumn, and the remainder during the Autumn of the ensuing year . . . All unpaid balances bear interest at the rate of eight per cent, which is certainly favorable to the supplier of the goods. Owing to climatic conditions, there is occasional failure of the harvest, as in Canada and other parts, so that undue pressure is inadvisable from the point of view of steady and permanent trade."

NEW JAPANESE ENTERPRISES

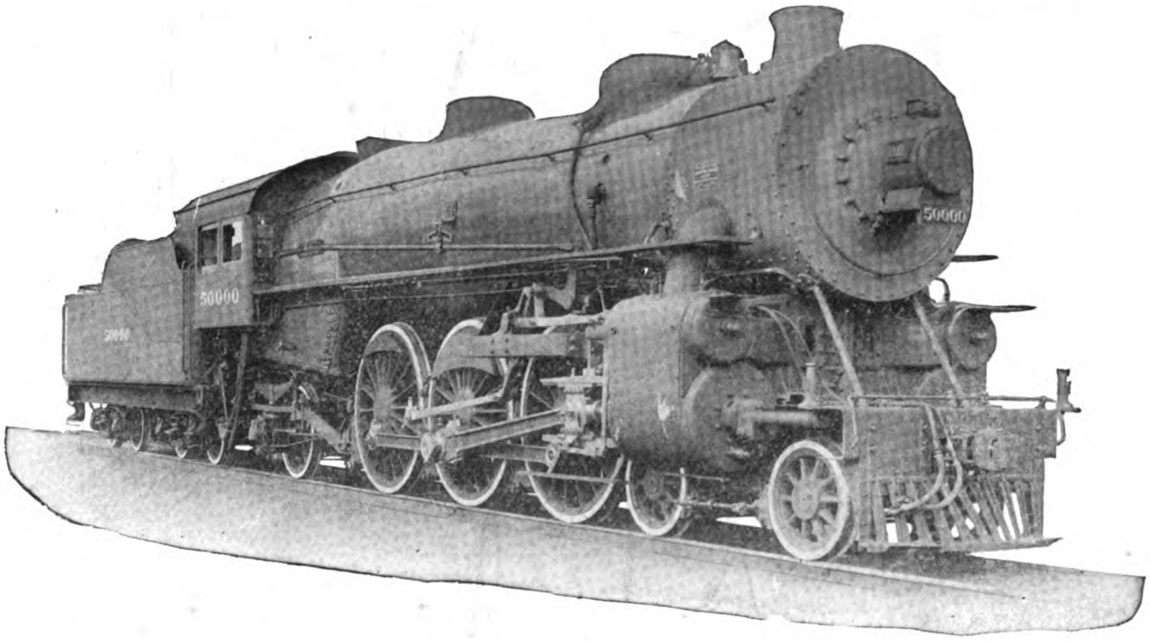
According to the latest investigations of the Department of Agriculture and Commerce of Japan, the number of business companies inaugurated during the month of July and their capital and denominations are as follows:

	Number.	Capital. Yen
Agricultural Companies	9	251,900
Fishery Companies	2	250,000
Brewery Companies	12	122,720
Provision Factories	10	52,810
Weaving Industry	32	2,164,650
Chemical Engineering	11	185,800
Pottery Factories	5	43,000
Metal works	5	63,500
Machine factories	9	187,500
Gas and Electric Companies	10	1,613,000
Miscellaneous Engineering	39	516,826
Mining Company	1	300,000
Sales Companies	77	724,240
Godown Companies	8	52,250
Banks	2	155,000
Trust Companies	14	178,000
Insurance Company	1	500,000
Miscellaneous Companies	60	1,759,910
Transport Companies	12	628,475
Total	319	9,809,581

TO DEVELOP INDO-CHINA

M. Albert Metin's report to the French Chamber on the ninety-million-franc loan solicited by French Indo-China is now available. It has been made in the name of the committee for Foreign Affairs. A part of this loan (f.26,000,000 in the Government project) is destined to cover the excess sums spent in executing the programme of the 1898 loan of f.200,000,000. The reporter points out that this earlier programme was based on insufficient studies, and expresses the desire that similar blunders may be avoided in future. Profiting from the fact that the loan of f.200,000,000 has not been completely realised, he here reduces the deficit to be covered from f.26,000,000 to f.23,400,000. As regards the balance of f.66,600,000 to railways M. Metin proposes to devote nearly f.29,000,000 to finish two lines of the former programme—the line from Hanoi to the frontier of China, and that from the delta of Tong-King to Hue. At the head of the new lines is that which will join Cochin-China to the new provinces of Cambodia Battambang. The reporter regrets that the construction of the branch line from Tourane to Savannaket cannot be immediately undertaken, though it is indispensable to the penetration of Laos, and says the construction of a road must provisionally satisfy. The irrigation works in Middle Tonking and in Annam will absorb f.19,000,000. M. Metin likewise approves the appropriation of a sum of f.3,000,000 for the building of Franco-native schools, which will permit in particular the development of professional education. We may note that f.600,000 will be used to establish a central station of wireless telegraphy at Saigon. Finally, in view of the variable character of Indo-Chinese receipts, comes the important recommendation that the French State should guarantee the loan, and that the military contribution of the colony should be reduced by f.3,500,000. M. Metin advises, further, a policy of economies, as he had done in his preceding report on the Budget of Indo-China.—*Exchange.*

THE 50,000TH LOCOMOTIVE OF THE AMERICAN LOCOMOTIVE COMPANY



EXPERIMENTAL PACIFIC TYPE LOCOMOTIVE NO. 50,000. BUILT BY THE AMERICAN LOCOMOTIVE COMPANY. DESIGNED TO PROVIDE THE MAXIMUM POWER PER POUND OF WEIGHT. IN ACTUAL SERVICE THIS LOCOMOTIVE HAS DEVELOPED H.P. FOR EACH 121.4 LBS. OF ITS TOTAL WEIGHT

An experimental Pacific type locomotive designed to provide the maximum power per pound of weight. Has developed in actual service 1 H.P. for each 124.4 lbs. Total Weight.

In an effort to determine the extent to which the efficiency and capacity of a passenger locomotive of approved wheel arrangement could be developed without exceeding the existing Permanent Way limitations of the standard railways, the American Locomotive Company have recently designed and constructed, at their own expense and as an experiment, a heavy Pacific type passenger locomotive, the performance of which promises to mark an epoch in the history of locomotive construction. This locomotive, which is illustrated herewith, was developed in consequence of the thoroughly appreciated need of greater sustained capacity to meet the maximum requirements of modern passenger service and while the great power obtainable will not be demanded by Far Eastern railroads for some time to come, the refinement of design has brought out many interesting details which can be incorporated in lighter locomotives with the result that their efficiency will be greatly increased. It is to be expected that the great advancement in locomotive engineering typified by this design will be appreciated by engineers the world over and we accordingly welcome the opportunity to place before our readers a few of the details of design which have caused this locomotive to excite so much comment in American railway circles.

Untrammelled by any outside specification or the necessity of conforming to any railroad's existing standards, the builders had a free hand to embody in this design their idea of the best locomotive engineering practice. The fullest application of approved developments in locomotive design and materials was the means employed for the accomplishment of the object in view and the latest knowledge of general proportions, the recent developments in the manufacture of materials, refinement in the design of details, all were combined in order that the utmost possible economy in operation might be secured. To accomplish the purpose of the design the maximum capacity per pound of weight the largest boiler capacity within pre-determined wheel loads was the essential feature and with this end in view, every pound of weight in all of the parts that was not essential to strength or durability, was eliminated and the weight thus saved utilized in the provision for a larger boiler.

The following comparison of locomotive No. 50,000 with other leading examples of Pacific type locomotives of approximately equal weights shows strikingly the larger boiler provided in the former in proportion to its weight.

	50,000	A.	B.	C.	D.
Total weight of locomotive	lbs 269,000	lbs 269,000	lbs 271,000	lbs 270,000	lbs 266,500
Type of boiler	Conical connect.	Conical connect.	Conical connect.	Straight	Conical connect.
Outside diameter at front end	76¾″	72″	72″	79¾″	72″
Largest diameter	87″	83″	83″	83¼″	83″
Firebox length	114″	105⅛″	108⅛″	111″	108⅛″
Firebox width	75¼″	75¼″	75¼″	80¼″	75¼″
Tubes number	207	175	242	343	38
Flues number	36	32	28	—	—
Tubes, diameter	2¼″	2¼″	2″	2¼″	2″
Flues, diameter	5½″	5½″	5⅜″	—	—
Tubes, length	22 ft.	21 ft. 6 in.	21 ft. 6 in.	21 ft.	20 ft.
Heating surface, total	sq. ft. 4048	sq. ft. 3424	sq. ft. 3784	sq. ft 4427	sq. ft. 4210
Superheating surface	897	765	705	—	—
Grate area	59.75 ft.	56.5 ft	56.5 ft.	61.8 ft.	56.3 ft.

In the larger boiler thus secured, the utmost care was taken to embody the best proportions and the most carefully designed details. Approved fuel saving devices, the superheater and brick arch, were applied and moderate steam pressure with cylinders carefully proportioned to the boiler so as to give the most economical point of cut-off at the maximum boiler capacity, used. It will be noted that the boiler of locomotive No. 50.000 has 624 and 264 more square feet of evaporative heating surface combined with from 132 to 192 more square feet of superheating surface than the other two superheater locomotives respectively, both of the which are of equal or greater weight. Compared with the two locomotives not equipped with superheater, the locomotive has at the most only 379 square feet of direct evaporating surface less, which is undoubtedly three or four times offset by the economy secured with the 879 square feet of superheating surface. This is the largest amount of superheating surface provided in an American passenger locomotive up to the present time and has resulted in realizing greater economy in operation due to the greater degree of superheat attained. Compared with another locomotive equal weight also equipped with superheater, but of less superheating surface and giving an average of 63 degrees less superheat, No. 50,000 has shown in service tests an average greater economy of 13 per cent in fuel and 14 per cent in water consumption per indicated horse power hour.

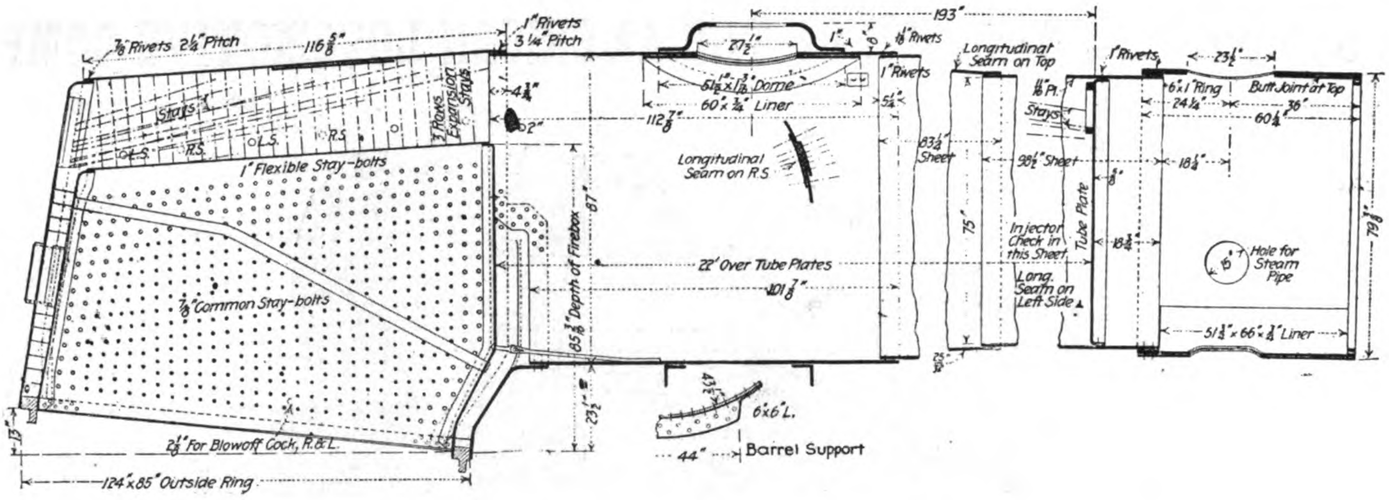
The superheater is of the Schmidt design, type "A," and consists of 36 5½-inch flues each of which in turn contains four 1½ inch seamless steel units. A damper of the usual design is provided which automatically regulates the flow of gases through the superheater flues when the throttle is opened and closed. In the tests, the maximum superheat obtained reached 341 degrees whereas the average amounted to 276 degrees.

To further increase the boiler capacity through improved economy, the firebox is equipped with a "Security" sectional brick arch. This type of arch in which the brick rest on water tubes, is rapidly replacing the old bracket or stud supported arch, its two cardinal features being that the circulation of water in the legs of the boiler is greatly facilitated by the arch tubes and that the brick are easily removed and replaced whenever tube inspection becomes necessary. Applications of this arch have frequently resulted in increases of boiler capacity of as much as ten per cent.

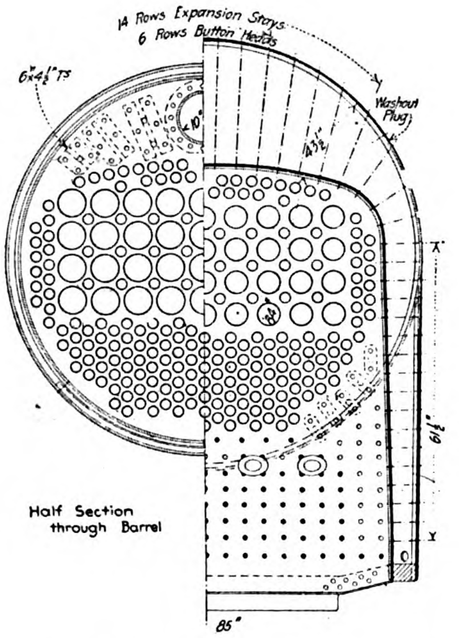
Aside from this large boiler capacity a number of new features have been introduced with the object in view of saving in weight and securing improved economy in operation. Among these the most important are the following:—

- Cast steel cylinders with cast iron bushings.
- Steam pipes arranged to connect with the cylinders outside of smoke box.
- Screw reverse gear.
- A self-centering device for the valve stem.
- A new arrangement of guide for the extended piston rod end.
- Improved outside bearing radial truck.

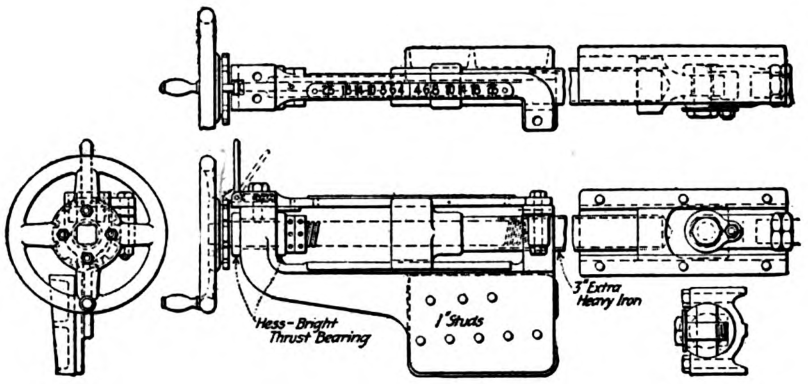
Most of these features, modified somewhat in structural details, have since been adopted into the Builder's regular practice and have been extensively used on locomotives since built by them. These are shown in detail in their latest form by the accompanying illustrations, an inspection of which will at once make it clear that the fundamental improvements while originally



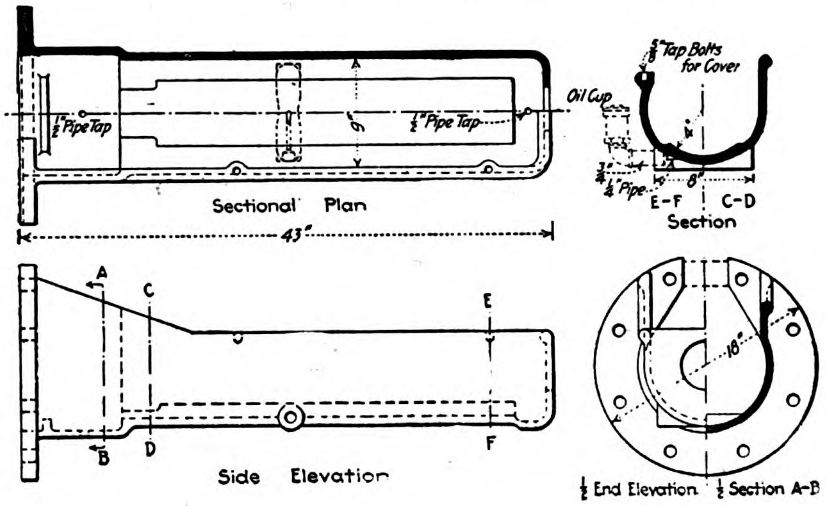
BOILER AND FIREBOX OF EXPERIMENTAL LOCOMOTIVE



CROSS SECTION OF BOILER AND FIREBOX, SHOWING THE SUPERHEATING TUBES

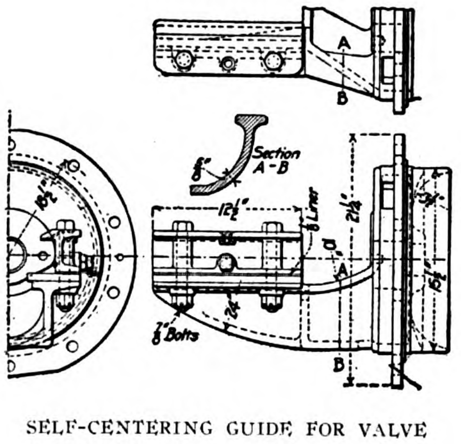


SCREW REVERSING GEAR



SELF-CENTERING GUIDE FOR THE EXTENDED PISTON ROD.

(BOLTED TO THE FRONT CYLINDER HEAD)



SELF-CENTERING GUIDE FOR VALVE STEAM (CAST ON THE BACK HEAD OF THE VALVE CHAMBER

worked out in connection with a heavy locomotive, are equally applicable to the lighter designs of equipment now in use on the Eastern railroads.

CAST STEEL CYLINDERS.

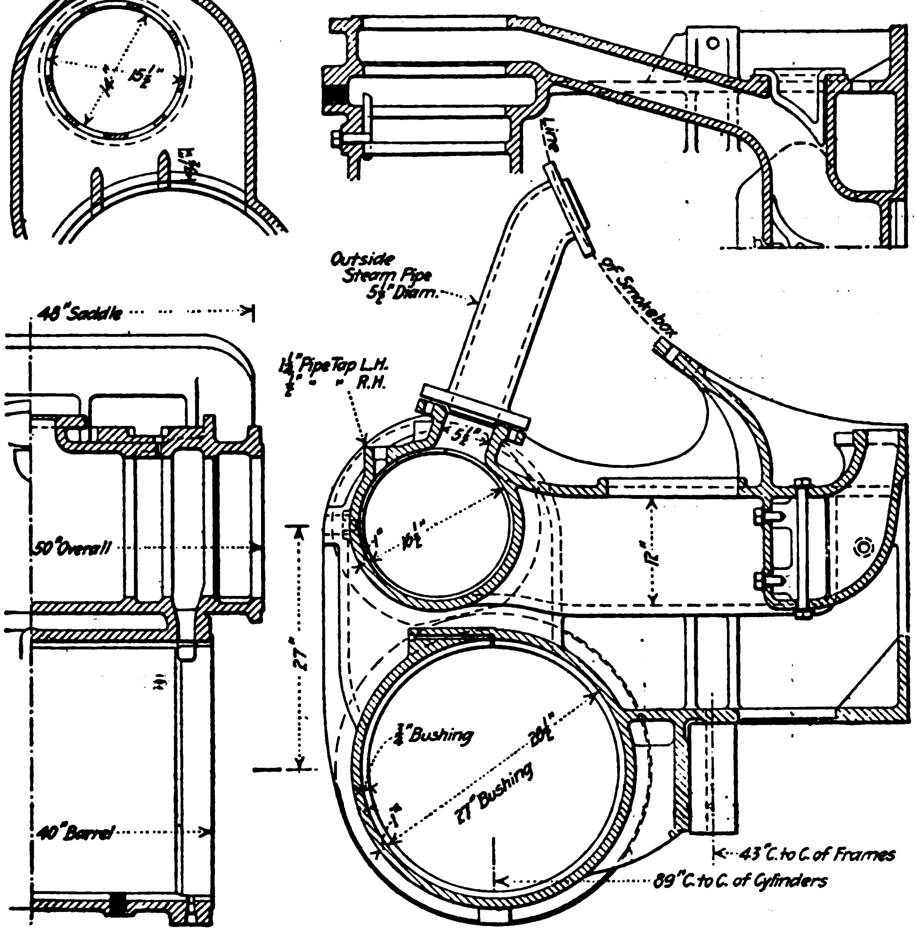
This is the first instance of the use of cylinders of this construction in American locomotive practice and constitutes one of the most radical departures from conventional practice that is to be found in the design. Vanadium steel was employed for the main castings, cast iron being used for the bushings alone, and as a result the 27 x 28 inch cylinders with which this locomotive is equipped, weigh 2,660 pounds less than cast iron cylinders of ordinary constructiou having but a 22 inch stroke and approximately 4,000 pounds less than inside steam pipe cylinders of equal dimensions.

OUTSIDE STEAM PIPES.

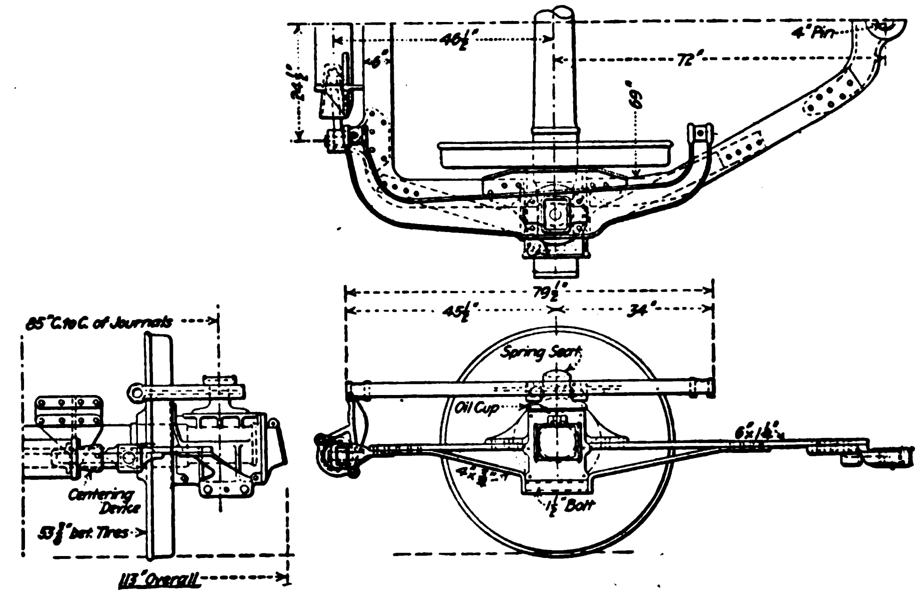
The arrangement employed was really necessitated because of the use of cast steel for the cylinder castings, this metal making it very essential that the design be such as to result in as simple as possible a casting. Because of its many advantages among which mention may well be made of the following, the outside steam pipe construction is being received most favorably among railway operating officials.

Advantages of the outside steam pipe design :—

The elimination of the central live steam passages in the cylinder saddle thus resulting in a more direct passage of the steam from dry pipe to steam chest.



CAST STEEL CYLINDERS AND SADDLE WITH OUTSIDE STEAM PIPES. (THE OUTSIDE STEAM PIPES ENABLE THE SADDLE DESIGN TO BE MADE MUCH MORE SIMPLE THAN WHEN STEAM PASSAGES ARE FORMED IN IT IN THE USUAL MANNER)



REAR TRUCK OF OUTSIDE-BEARING RADIAL TYPE FOR THE EXPERIMENTAL LOCOMOTIVE OF THE AMERICAN LOCOMOTIVE COMPANY

Improved steaming capacity of boiler because it removes much of the obstruction to draft in the smoke box which is present with steam pipes of the conventional design.

A much better joint with cylinders is also provided by the 8 bolts of equal length with the symmetrical flange, in place of the usual 4 or 6 bolt and style of flange adapted to the best inside steam pipes. Should a small leak occur at the cylinder joint it has no injurious effect on the steaming of the engine, merely wasting steam but not interfering with the vacuum in the smoke box as in the case of a similar leak with the ordinary inside pipe construction.

It is also probable that the elimination of the live steam passages in the cylinder saddle will tend to minimize the loss of cylinders from cracking in service.

SCREW REVERSE GEAR.

The screw reverse gear can be easily arranged to give about eleven times the leverage obtained with the reverse lever as ordinarily proportioned and as a result the locomotive can be handled with greater ease. With the lever and quadrant arrangement usually employed considerable loss in economy and efficiency in operation ensues from the fact that steam is not used expansively with full throttle and cut-off arranged at the most economical point, due to the fact that when a high speed has been attained it is often a risk to change the reverse lever because of the liability of the lever getting out of the hands of the engineer. The wheel can be spun around very rapidly so that only from four to six seconds are required to completely reverse the engine. The American Locomotive Co's., design of this gear differs from that heretofore used in that it has a ball thrust bearing and is so arranged as to provide a straight line pull with the resultant elimination of the bending strains usually found in the ordinary gears.

SELF-CENTERING VALVE STEM GUIDE.

Another important improvement in detail design is the self-centering guide for the valve stem, a device which consists of a guide made integral with the back head of the piston valve chamber and so constructed as to be easily adjusted for wear. The chief advantage of this arrangement is that it can be erected, taken down, and replaced without lining up, at the same time insuring that the valve stem guide is absolutely in line with the piston valve chamber. It permits of the use of a straight design of combination lever without forks, is self-supporting so that no bracing from the guides or any source other than the cylinders is required, and affords greater lateral stability than is obtained in other designs.

SELF-CENTERING EXTENDED PISTON ROD GUIDE.

This device, like the valve stem guide, is self-centering and can be removed and replaced in position without lining up and at the same time exactly coincides with the longitudinal axis of the cylinder. It consists simply of a shoe fitted to the extended end of the piston rod and composed of a cast steel body with a cast iron wearing block firmly secured to it by four bolts. The shoe slides on a guide fastened to the cylinder head and the circular face of the guide registers with a corresponding face on the front head. The guide surface is struck from the center of the cylinder and the guide so constructed that it can be bored out and faced off at one setting of the machine. The bearing surface of the shoe and guide are made radial so as to provide sufficient wearing surface for two or three years without requiring adjustment of linings or repairs of any kind. Furthermore, the guide surface being concentric with the center of the cylinder, any refinement in adjustment between the shoe on the front of the rod and the main crosshead, is unnecessary, since while the crosshead works on a flat guide, the piston rod shoe will swing around the center of the cylinder and thus always take a fair bearing without cramping.

IMPROVED OUTSIDE BEARING RADIAL TRUCK.

Through the use of the American Locomotive Co.'s improved design of outside bearing radial truck a saving in weight of over 5,000 pounds was effected, this being possible as a result of the mission of the heavy slabbed frame sections of the ordinary design. This truck has greatly improved the riding qualities of the locomotive as a result of a provision which has been made for a universal adjustment of the springs; to the rise and fall action of the spring centering device; and the inclined friction plates which operate to restore the truck to its normal central position on entering a tangent after passing through a curve. Moreover, all spring seats being in compression, any wear and lost motion which may accumulate is automatically taken up, the design thus being an improvement from the maintenance standpoint.

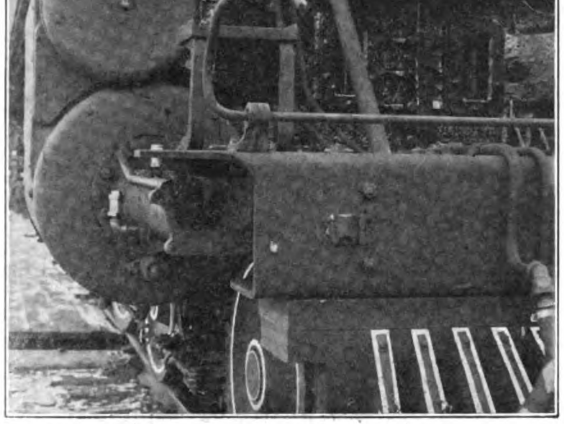
PRESSED STEEL BUMPER AND PILOT.

Further evidence of the refinement in detail carried out in this locomotive to keep the weight of every part to a minimum consistent with proper strength, is furnished by the use of a pressed steel bumper and pilot such as has heretofore been successfully employed on the Lake Shore and Michigan Southern Railway. Compared with the ordinary design of cast steel bumper the pressed steel type weighs approximately 1,200 pounds less, while as between the pressed steel and wooden pilot there is a difference of 350 pounds, a total saving of 1,500 pounds being effected in these two details alone.

VANADIUM STEEL.

Additional strength without increased weight is secured by the liberal use throughout the design of vanadium steel for many of the principal parts. Some of the details constructed of this alloy are; driving wheel centers, frames, rods, piston rods, valve motion work, springs, crank pins and cylinders.

Locomotive No. 50,000 sets a new high mark for the capacity and economy attainable within



PRESSED STEEL BUMPER AND PILOT

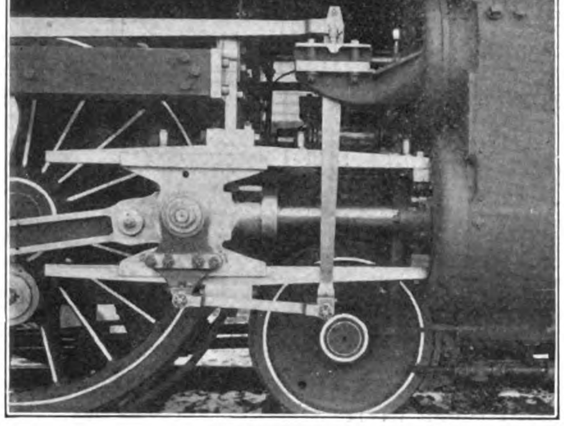
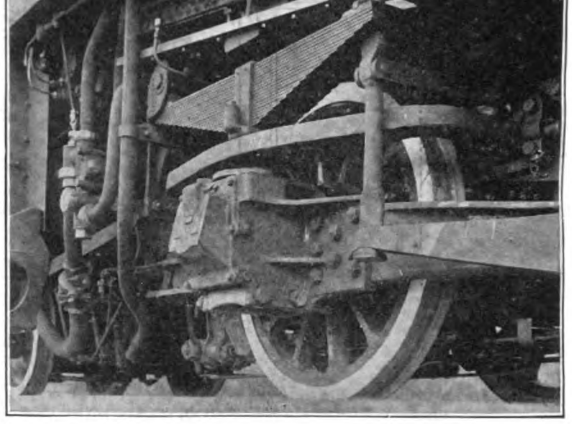


ILLUSTRATION SHOWING PORTION OF MOTION WORK AND VALVE STEAM ENTERING DEVICE



AMERICAN LOCOMOTIVE COMPANY'S IMPROVED TYPE OF TRAILING TRUCK. NOTE ABSENCE OF USUAL DOUBLE SLABBED FRAME SECTIONS

the limitations of conservative wheel loads in a modern passenger locomotive designed for sustained high speed service with heavy loads. It has also pointed out a way by which present practice may be greatly improved by better proportion of boiler to engine capacity, greater refinement in the design of details, the best use of fuel saving devices the value of which have been tried and proved in service, and the use of the most up-to-date materials. For these reasons this locomotive merits investigation and the most careful study of all the details of its design on the part of all railroad officials interested in locomotive operation.

The general dimensions, weights and ratios are given in the following table:—

GENERAL DATA.

Gauge	4 ft. 8½
Service	Passenger
Fuel	Bit. coal.
Tractive effort	40,800 lbs.
Weight in working order	269,000 lbs.
Weight on drivers	172,500 lbs.
Weight of engine and tender in working order	430,500 lbs.
Wheel base, driving	14 ft.
Wheel base, total	35 ft. 7 ins.
Wheel base, engine and tender	68 ft. 2½"

RATIOS.

Weight on drivers÷tractive effort	4.26
Total weight÷tractive effort	6.68
Tractive effort×diam. of drivers ÷heating surface	596.00
*Total heating surface÷grate area	90.50
Firebox heating surface÷total heating surface*, per cent	4.60
Weight on drivers÷total heating surface*	32.00
Total weight÷total heating surface	49.60
Volume of both cylinders, cu. ft.	18.60
*Total heating surface cylinder volume	298.00
Grate area÷cylinder volume	3.20

CYLINDERS.

Kind	Simple
Diameter and stroke	27 in. × 28 in.

VALVES.

Kind	Piston.
Diameter	14 ins.
Greatest travel	6½ in.
Outside lap.	1¼ in.
Inside clearance	¼ in.
Lead in full gear	Forward ⅛ in. Backward ½ in.

WHEELS.

Driving, diameter over tires,	79 ins.
Driving, thickness of tires	3½ ins.
Driving journals, main, diam. and length	11 × 12 ins.
Driving journals, others diam. and length	10½ × 12.
Engine truck wheels, diameter	36 ins.
Engine truck, journals	6½ × 12.
Trailing truck wheels, diameter	50¼ in.
Trailing truck, journals	8 × 14 in.

BOILER.

Style	Conical.
Working pressure	185 lbs.
Outside diameter of first ring	76¾ in.
Firebox, length and width	114⅛ × 75 in.
Firebox plates, thickness	⅜ & ½ in.
Firebox, water space	4½ in.
Tubes, number and diam.	207—2¼ in.
Tubes, superheater	36—5½.
Tubes, length	22 ft.
Heating surface, tubes	3,800 sq. ft.
Heating surface, firebox	248 sq. ft.
Heating surface, total	4,048 sq. ft.
Superheater surface	897 sq. ft.
Grate area	59¾ sq. ft.
Smokestack, height above rail	14 ft. 7⅞ in.
Center of boiler above rail	9 ft. 11 in.

TENDER.

Tank style	Water bottom.
Frame	13 in. channels.
Wheels, diameter	36 in.
Journals, diam. and length	5½ × 10 in.
Water capacity	8,000 gallons.
Coal capacity	14 tons.

* Equivalent heating surface equals 5,394 sq. ft.

INDIA'S NEW CAPITAL

The Government of India has decided to invite architects and others residing in India to submit competitive designs for the residences of various grades of officials at Delhi. A notification, calling for the submission of designs, will shortly be issued. A committee, assisted by the Consulting Architect to the Government of India, will examine the designs and liberal premiums will be awarded to successful competitors. One of the conditions of the competition will be that the competitor should certify that his designs and drawings were prepared in India by him or under his direct supervision. The drawings will be publicly exhibited after the committee have made their award. It is hoped by the early construction of a number of permanent residences on designs selected from this competition, to reduce expenditure on the provision of temporary quarters. As the detailed plan of the laying out of the new capital has not yet been prepared the location and general arrangements of the principal public buildings have not yet been fixed. Until this has been done, no arrangements can be made with regard to the designs for offices and other large buildings. The Government, however, hope before long to be in a position to call for competitive designs for certain public offices and other buildings.

REVIEW

KNOTS, SPLICES AND ROPE WORK

BY A. HYATT VERRILL 128 (5 X 7) PAGES,

150 ORIGINAL ENGRAVINGS,

PRICE 60C.

This is a practical book, giving complete and simple directions for making all the most useful and ornamental knots in common use, with chapters on Splicing, Pointing, Seizing, Serving, etc. This book is fully illustrated with 150 original engravings, which show how each knot, tie or splice is formed and its appearance when finished. The book will be found of the greatest value to Campers, Yachtsmen, Travellers, Boy Scouts, in fact to everyone having to use or handle ropes for any purpose.

The book is thoroughly reliable and practical and is not only a guide but a teacher. It is the standard work on the subject.

The Norman W. Henley Publishing Co., 132 Nassau Street, New York.

RUBBER-GROWING INDUSTRY OF THE PHILIPPINE ISLANDS

In a communication directed to the Secretary of the Manila Merchants' Association, the Hon. Dean C. Worcester, Secretary of the Interior, gives the following authoritative and official information on Rubber Growing in the Philippines.

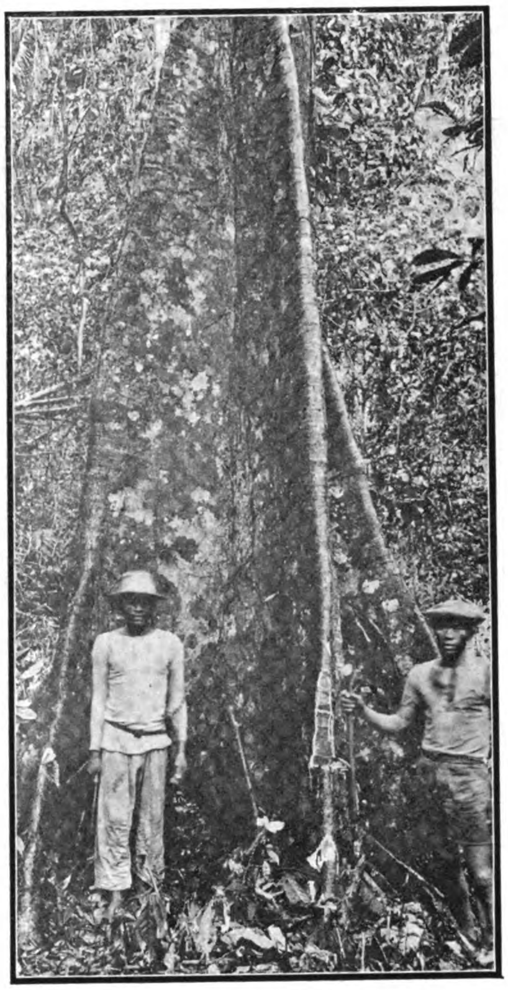
SIR: Referring to your letter requesting information relative to the rubber-growing industry in these islands, I have the honour to inform you that copies of it were forwarded to the Director of the Bureau of Science, the Director of the Bureau of Agriculture, and the Director of the Bureau of Forestry, and that each of those officials was requested to furnish such information as was in his power to give.

The Director of the Bureau of Agriculture sent out thirty-two letters to rubber planters in the Moro Province, requesting information based on their practical experience. Up to July 7 but one reply was received and so far as I am aware no others have since come in.

My own absence on my long annual inspection trips prevented me replying sooner to your inquiry. As you are aware, I addressed a letter to you under date of July 7, 1910, embodying all the information which I had been able to gather up to that date, but as it seemed probable that I might obtain more reliable information relative to the cost of clearing the land and planting it, and relative to the returns which might be received from catch crops, I have delayed forwarding this letter until the present time.

I knew that I could obtain especially reliable information relative to the cost of bringing land under cultivation from Mr. C. H. Lamb, Superintendent of the Iwahig Penal Colony. As you know, the land under cultivation by the convicts at this Colony has for the most part been made available by clearing away the virgin forest and as a strict account of all labor used is kept, Mr. Lamb's figures should be rather trustworthy. They were received just prior to my departure from Manila.

METHOD OF TAPPING A PARA RUBBER TREE THIRD DAY AFTER TAPPING, BUITENZORG, JAVA



READY TO FELL A LARGE GUTTA PERCHA TREE FOR EXPERIMENTAL PURPOSES, ZAMBOANGA, P. I.

A RUBBER VINE, WESTERN MINDORO

LAND LAWS.

As you yourself are doubtless aware, no corporation authorized to engage in agriculture may own or control more than 2,500 acres of land. There is no restriction as to the amount of land which an individual may lawfully own, but there *is* a restriction on the amount of public land which he may purchase, which may not exceed 40 acres. A corporation may purchase not to exceed 2,500 acres of public land. The minimum price which may be charged for such land is P10 per hectare, and where the land in question is wild and uncultivated it is our custom to charge this minimum price. The provisions of existing law relative to the rental of public lands are more liberal than are those relative to their sale. Either an individual or a corporation may rent not to exceed 2,500 acres. Leases run for 25 years with the privilege of renewal at the end of this period for an additional 25 years. The rental price cannot be less than 50 centavos per hectare (approximately 10 cents, gold, per acre) during the first 25-year period, nor more than P1.50 (approximately 30 cents, gold, per acre) per hectare during the second 25-year period. It is our custom to charge the minimum price when wild land is taken up as we are very desirous of seeing some part of the enormous area of rich agricultural public lands in the islands brought under cultivation.

If the product from 2,500 acres would not be sufficient, several individuals could rent 2,500 acres each and make such arrangement relative to the sale of their products as might seem advantageous to them.

FAVORABLE CONDITIONS IN SOUTHERN ISLANDS.

All informed persons seem to be agreed that it is highly desirable to establish rubber plantations in the southern part of the Philippines outside of the typhoon belt, owing to the fact that the rubber producing trees ordinarily planted are somewhat brittle and are liable to suffer injury as the result of a heavy wind storm.

There are very extensive areas of public land suitable in every way for rubber planting in Mindanao, Basilan, Tawi Tawi, and Palawan, and, as you doubtless know, these

regions are almost entirely free from very violent wind storms.

Land in the Agusan River Valley is especially well suited to rubber growing. Land in the vicinity of the river itself has the advantage of uninterrupted communication with the sea by water. The population of this valley is sparse, and public lands may be rented there in large tracts. According to the best information which I have been able to obtain, drought is absolutely unknown in this region. While it appears to be heavily forested, much of the vegetation is in the form of comparatively small trees, vines, etc., which can be cleared away at small expense, leaving a few very large trees which may be allowed to stand without interference with the growth of any plants not harmed by a moderate amount of shade.

A TREE OF PALAQUIUM GUTTA JUST TAPPED TJIPITIR, JAVA

In the subprovince of Bukidnon there are immense grassy plains covered not with cogon, but with pasture grass, which is not ordinarily more than knee high, or waist high at the outside. These lands are very readily brought under cultivation, and no preliminary clearing whatever is necessary. They lie at an altitude of from 900 to 3,000 feet above sea level, and the climate is cool and healthful. During a period of some three years since this subprovince was established as a political division, it has, I believe rained every month. The people, however, state that once in five or six years a drought is likely to occur. Any more or less remote danger from this source can be avoided by arranging for irrigation. This country also is sparsely inhabited, and the people are pacific. The nearest port is Cagayan de Misamis, where there is a pier alongside of which coast guard boats can lie. A good trail, which will soon be converted into a cart road, affords communication with the coast on the east side of the bay, from which communication may be had with Cagayan de Misamis by water, or around the bay over a fine automobile road. However, on the east side of the bay there is a sheltered cove where a pier, alongside which interisland steamers could lie, could be readily constructed.

I have seen Ceara rubber growing both in the Agusan Valley and in the subprovince of Bukidnon. In both instances young plants were extraordinarily robust.

CEARA RUBBER TREE.

As the rubber planting industry is so new in these islands, and as the variety of rubber producing trees which may be planted is considerable, it is not easy to make a reliable statement as to the returns which may be expected. Undoubtedly the tree which gives the quickest return is the so-called Ceara rubber tree. As previously stated, it grows with extraordinary luxuriousness in the Agusan River Valley and Bukidnon. There seems

A GUTTA PERCHA TREE TAPPED SO THAT MUCH OF THE MILK IS LOST ON THE GROUND, DESTRICT OF ZAMBOANGA, P. I.

every reason to believe that it would produce as abundantly here as anywhere on earth. I have shown samples of Philippine Ceara rubber to persons claiming to be experts, and they pronounce them to be of the best quality. You can obtain samples of Ceara rubber of excellent quality by showing this letter to the Director of the Bureau of Science and informing him that I have requested that you be furnished such samples from the supply of Ceara rubber which I recently gave him for a commercial exhibit in the museum on Calle Anloague.

The following information relative to Ceara rubber is taken from a Bureau of Agriculture circular on rubber:

In British and German East Africa Ceara rubber is looked upon very favorably. Considerable tracts of land have been planted with it during the past few years, and others are being planted. The practice there is to plant the seedlings in rows 12 feet apart and 6 feet apart in the row on lands that have been cleared of stumps and underbrush at the beginning of the rainy season. Every other tree in the row is "bled" to death while still young, leaving the permanent trees at distances of 12 × 12 feet.

The tree thrives best in a good friable loamy soil of fair depth, and where the temperature and humidity are high, such as exists at many parts of the coast and other similar districts; but the elevation must not exceed 3,000 feet, as grown above this height it has been proved to contain too much rosin to be of sufficient commercial value.

Propagation is usually effected by seeds, planted in seed beds, though they are sometimes planted "at stake"; but plants may be grown from cuttings. Seeds for planting should be at least a year old from the time they fall from trees, and the latter should be from three to four years old, as seed collected from younger trees does not produce vigorous plants. If

ABSENCE OF DEEP SCARS AFTER SEVERAL YEARS TAPPING, BUITENZORG, JAVA

fresh seed is planted, i.e., seed newly collected, germination is very poor, if at all, whereas seed one or two years old germinates readily and well, and gives good results.

Ceara trees come into bearing at about 3 years of age, and produce well until the tenth year, after which producing is not profitable.

Twelve thousand Ceara rubber trees planted in Siasi produced seed at a little more than 1 year of age.

The following information on Ceara rubber in general, and especially in the Philippines, is taken from a report on the cultivation of rubber by Dr. J. W. Strong, the same having been furnished me by the Bureau of Forestry.

Ceara rubber, so called from the province of that name in Brazil where it has its habitat, is known botanically as *Manihot glaziovii*,

natural order Euphorbiaceæ, to which also belongs our common casava plant (*Manihot utilissima*), better known as "camote cahoy."

The Provinces of Ceara and Clara, Brazil, are the so-called dry provinces. Quoting from the report of Robert Cross, a noted botanist to the Indian Government in 1877, he describes the locality as possessing "a very dry, arid climate for a considerable part of the year. The locality traversed by me nowhere seemed to be elevated more than 200 feet above the sea. The soil was in places a sort of soft sandstone or gravel which was bound up in the most extraordinary manner." In other places he "came on a large tract of land covered with immense masses of gray granite. Many good sized rubber trees were growing in the spaces between these granite masses."

The Ceara tree is of moderate size, from 30 to 50 feet high, and 8 to 24 inches in diameter. The leaves are palmate, deeply cut into three, five, or seven oblong ovate lobes, smooth on both surfaces, thin in texture, deep bluish green above, and light beneath. Some of the young plants show a pink petiole. The flowers are large, unisexual and very numerous. The fruit is a round capsule less than 1 inch in diameter, containing three highly polished seeds variously mottled in color. The seeds have an extremely hard coat, and if kept dry, retain their fertility for years. When the seed capsule becomes dry, it bursts with considerable force, throwing the seed several yards away from the tree. I have found plants growing 50 feet from the nearest tree.

Ceara rubber is gathered in Brazil and shipped as "Ceara scrap." Only the simplest, crudest method is used. The collector, before beginning work, sweeps the sticks and stones from about the tree, and after stripping off the thin outer bark, he hacks and cuts the tree from the base to as high as he can reach, letting the latex or milk trickle down the tree to the ground. The latex coagulates very rapidly when left to itself, and collected in this manner is loaded with all sorts of impurities. To quote from Brant's India Rubber, Gutta-Percha, and Balota: "Ceara rubber has a beautiful amber color and is nearly transparent, a property which, according to Marellet, is not possessed by any other rubber. The latex of Manihot is at least equal to, and perhaps superior to that of Hevea (Para), as it contains fewer nitrogenous substances which produce fermentation, and considerably less water. Instead of allowing the milky juice to trickle down the tree, it might be caught in cups and immediately mixed with alkaline water. In this manner the latex would be kept liquid for some time. In Ceara experiments have been made of this kind with excellent results, but unfortunately the native will not listen to anything new."

Ceara being such a quick grower it has been found impracticable to plant any catch crop between it after the first year. Hemp was tried in this province, and, while it did not affect the growth of the rubber, after two years the hemp was either dead or so stunted that it was of no further use.

In selecting land for planting Ceara two things must be considered. The land must be well drained, and should be protected from very high winds. Close planting will to a great extent protect from the high winds, but a wind brake of forest trees left standing would be valuable.

While Ceara will grow on most any soil, well drained, the soil and climatic conditions have great influence on the amount of latex produced, and consequently the amount of rubber contained therein. The richness of the soil, rainfall, season, and humidity of the atmosphere all play important parts in the yield of rubber, not only of Ceara, but other varieties; but of this more later on.

Ceara is readily propagated by seeds or cuttings, and stands transplanting well as far as living is concerned, but transplanting I have found often results in crooked, stunted trees, branching very low down. My experiments from cuttings have been very successful, so far as the cuttings taking root and growing, and the young trees seem to have plenty of latex. Those examined after one year have well developed root systems and the scar at end of cutting above ground entirely healed over.

In making a planting from cuttings, only smooth, straight branches from the best grown, highest yielding trees should be selected, and should not exceed 1 inch in diameter. The terminal ends of branches may be used with good results if planted at once, care being taken not to injure the tender bark. The larger cuttings should be about 12 inches in length, the top cut should be made sloping about 1 inch or more above a bud or leaf scar, and painted over with white lead; this will prevent decay and probably a hollow trunk. The bottom cut should be smooth, and just below a bud. The cutting can be kept in a cool shady place for a day or two without apparent harm. In planting the cuttings care should be taken to get them in the ground straight up, so as to get a straight trunk, and a hole must be made for the cutting, as shoving the cutting into the ground will very often result in slipping the bark and destroying the bud below ground, causing loss of plant or greatly delayed growth.

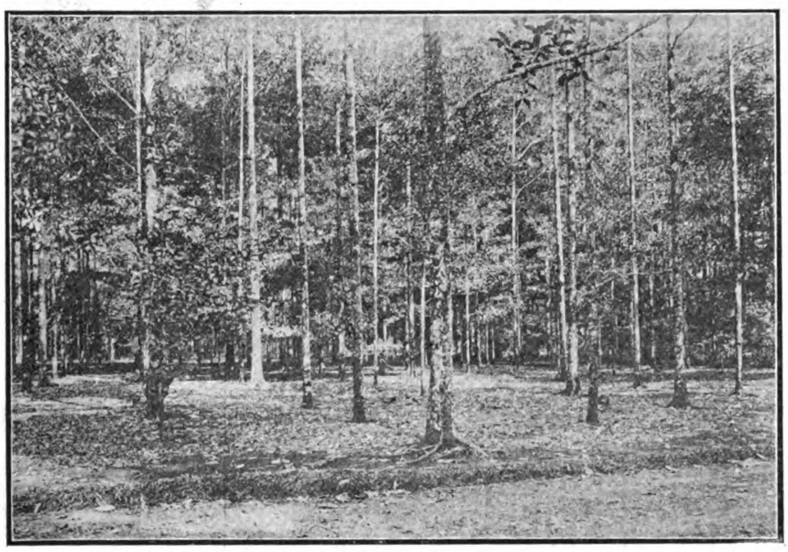
If it is decided to plant from seed, which no doubt is the easiest and best way, the land should be cleared and burned, and then laid off by line with stakes, perfectly square at the interval decided on for planting. The seed coat, being very hard and dense, should be filed on one side at the caruncle end, care being taken not to file too deeply, in which case there will be a loss of 100 per cent as ants and other small insects are very fond of the kernel, and will eat it up before germination starts. After the seed starts to germinate insects do not bother it.

The ground should be loosened for at least 6 or 8 inches deep at spot where seed is to be planted, and from three to five seed planted at each stake. If seed are planted in April or May the plants will be 2 feet high within a few weeks, and a catch crop of corn or palay, preferably the latter, should be planted to shade the ground and prevent it from washing, and more especially is this needed if the ground is rolling. The resulting crop of palay or corn will, as a rule, more than pay all expenses for the first year, and the ground will be comparatively free from weeds. About two weedings are all that will be required during the second year, and after that very few weeds will be found to grow,

After the tree is once started it should not be disturbed, as hoeing or digging about the roots of the young tree seems to cause crooked growth with low forking, Trees planted in Basilan in well plowed land, which were afterwards cultivated, while making good growth practically all branched low down, few reaching as high as 5 feet before branching; while trees not disturbed, planted in the hard ground from same seed, at the same time, made as good growth, with smooth, straight trunks from 6 to 10 feet before branching.

The tendency of Ceara is to make tall, straight trunks, if not disturbed, and as tapping will rarely or ever be done higher than 8 feet, the young tree may be thumbnail pruned at that height, by pinching out the terminal and causing the tree to branch. This will give a uniform appearance to the grove, and will give an increased circumference to the tree. In rich soil the tree makes a very heavy top, and it is a good idea to prune it back rather severely. In localities of heavy wind small branches may be brought across from one fork to the other, the bark removed from one side and on a large fork, the two surfaces brought together and tied in place will unite in a very short time and will act as a brace or truss, preventing the tree splitting.

The question of distance depends greatly on soil and locality. The richer the soil, the greater distance the trees should be planted apart, up to 25 by 25 feet; but it is thought that about 14 by 14 feet is a good distance to plant, and even more closely if high winds prevail. Planted at 14 by 14 feet, the branches will be touching in three years. The tree may be planted anywhere from sea level to 4,000 feet altitude.



PLANTATION OF GUTTA PERCHA TREES (PALAQIUM GUTTA) OF VARIOUS AGES, BUITENZORG, JAVA

MORO SAILBOATS, "VINTAS"

Very little experimental work has been done with Ceara rubber, except in the last two or three years, and the yield per tree is given at various amounts. Herbert Wright, perhaps the greatest authority on rubber, places the yield of a mature Ceara rubber tree at 1 pound per year; this for Ceylon. Other observers place the yield as high as 10 pounds per tree per annum.

TAPPING IN THE MORO PROVINCE.

On August 20, 1908, the writer decided to start a series of experimental tappings of young Ceara trees grown from seeds, the trees being just 3 years old on that day. Two hundred trees were taken for the experiment and numbered from 1 to 200 as they ran. The average circumference was 22.1 inches, and the average length of tapping surface was 32.5 inches.

At this time the trees were leafed and in full bloom. It was decided to make the series of tappings 7 days each for 21 days, with a rest of 2 weeks between each 7 days.

The full "herringbone" system was used, with laterals cut 8 inches apart. Small zinc drip-cups, with hooks to fasten to bark, were fixed at top of perpendicular. Each cup had a small round hole in bottom, next to tree, in which a wick was passed to permit a constant flow of ammoniated water down the cut. At the bottom of the perpendicular a piece of curved tin was inserted into the bark, conducting the latex to a cup at the base of the tree.

It was found that one-half of 1 per cent ammonia water in water placed in the drip cups would keep the latex fluid for days, and each collector carried a large bottle of the ammoniated water, a small amount of which he poured into the drip cup before tapping. Each collector also carried a squirt can of the same solution, and after all laterals were tapped a few drops were allowed to flow down the cut. This seemed to promote the flow greatly, and there was scarcely any scrap left in cuts. In fact there was so little that no inconvenience was caused to tappers in reopening the cuts each morning, and no effort was made to collect the scrap.

During the first seven days trees No. 1 to 100 were tapped every day, tapping was done from about 6 a.m. to 8.30, and resulted in 5,100 grams of dry rubber, or about 1⅔ ounces per tree.

The second seven days, Nos. 101 to 200 were tapped on alternate days for seven tappings, and resulted in 4,600 grams.

After resting two weeks the third tapping was begun and beginning with No. 2 alternate trees, all even numbers, were tapped for seven days, but tapping was done in the evening from 4 o'clock to about 6. It was noticed that the trees tapped latest in the evening gave the most latex.

This tapping resulted in 3,600 grams of dry rubber. making a total yield of 13 kilos 200 grams for the entire tapping, almost 4½ ounces per tree for 21 tappings.

	Grams.
First 7 tappings	5,100
Second 7 tappings	4,500
Third 7 tappings (evenings)	3,600
Total	13,200

Average per tree, 132 grams.

Average per tree per tapping, 6.29 grams.

Greatest amount from a single tree was from tree No. 197, which gave 224 grams of dry rubber during the seven tappings (second series, and is included in the general average). After a rest of two weeks this tree was tapped again every day for seven days, tapping being done in the evening, and yielded 180 grams of dry rubber. After another period of rest for two weeks it was tapped again every day for seven days, mornings, and yielded 104 grams of dry rubber. During this tapping it was noticed that laterals on left side of perpendicular ran well, but only top and bottom laterals on right side gave any latex. Some three days before the last series of tappings there was a severe wind storm and this tree was split down the main fork for nearly 2 feet, which may account for its behavior. The size of this tree 3 feet from the ground is 36½ inches circumference, and 54 inches the length of perpendicular of tapping surface. Total amount of rubber from this tree, 508 grams, or a little more than 1 pound. The last two tappings from this tree are not included in the general average, as it was tapped singly.

There was a marked difference in the yield of the trees. Quite a number were noted giving from 15 to 20 grams of dry rubber per tapping, while others gave scarcely any. One fine large tree in particular would only run a gram or so of amber colored latex, which would coagulate in spite of the ammonia.

Two trees in the test had been broken off by the wind some two months before, and the tops were entirely cut away, leaving bare stumps about 4 feet high, but each gave plenty of latex at each tapping.

Two trees standing near where some hemp strippers had been working about five months before were tapped alone, and gave almost double the amount of latex that other trees of same size gave remote from them. This is believed to be due to the large amount of refuse hemp waste, which was surrounding these two trees, and which had thoroughly decayed.

The men used for tapping were a Tagalog, a Yacan Moro, and a Tiruray. The tapping knife used was a modified Ceara rubber knife used in Ceylon. All of these men quickly learned to handle the knife so as not to cut the wood, and in a few days were quite expert tappers.

After the latex had ceased to flow in the morning or evening, it was brought in and after straining through brass wire gauze was poured into tin basins for coagulating.

Acetic acid was used to coagulate the latex, just sufficient being used to render the solution slightly acid. When the rubber had all coagulated, leaving the water clear, which was in about two or three hours, the spongy mass was pressed with the hands to expel the water, and afterwards passed through the rolls of an ordinary clothes wringer, which squeezed out most of the water and reduced the cake of rubber to about one-eight inch in thickness. These wet cakes, or "biscuits," were then placed on galvanized wire racks under sheds to dry.

There was invariably a small amount of scrap each morning or evening due to ants getting into the cups, in which case a small mass of coagulated rubber formed about them, due probably to the formic acid which they contain; formic acid being one of the most powerful coagulants of latex.

One man can tap and collect very easily from 100 trees per day, beginning at 5.30 and working until 8.30 a. m., at which time tapping should be discontinued, unless it is cloudy; in such case tapping can go on for an hour longer. If tapping is done in the evening also a larger number of trees can of course be handled.

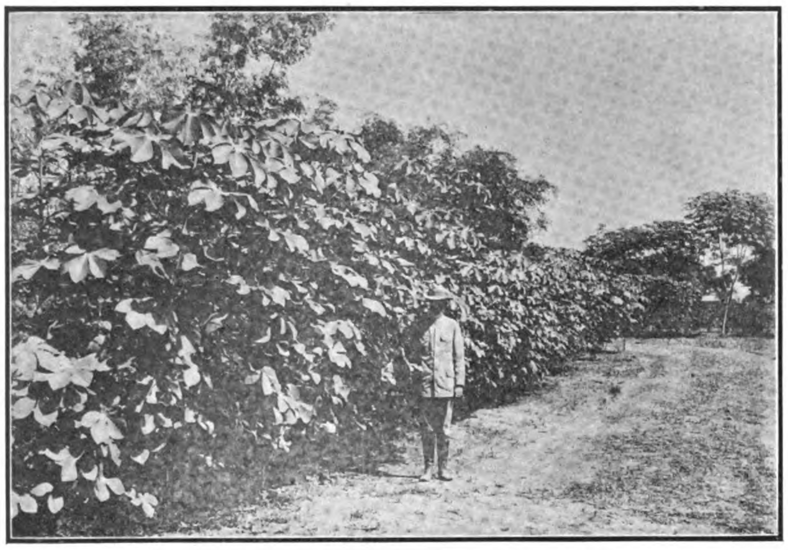
So far no fungus or insect pests have attacked Ceara rubber. Wild pigs, however, are very fond of the starchy roots and will do great damage if not fenced out or kept away by hunters.

Other rubber producing trees which may be planted are the following:

INDIA RUBBER TREE.

Ficus elastica.—This tree has been grown to some extent on a commercial basis in India.

Markham states that the trees may be tapped at the age of 25 years. From that time until the trees are 50 years of age the yield is estimated to be about 40 pounds per tree every three or four years. Only about 40 trees of this species can advantageously be planted on an acre of land and on this basis the yield of rubber per acre might be estimated at about 500 pounds per year. My information is that *Ficus elastica* is no longer grown as a rubber producer, even in its native habitat where other rubber producing trees have proved more profitable.



CEARA RUBBER PLANTS, EXPERIMENT STATION, MALATE, MANILA

TAPPING A GUTTA PERCHA TREE SO THAT ALL THE MILK IS COLLECTED IN SHELLS BENEATH. DONE BY MOROS IN TAUI TAUI, P. I.

PARA RUBBER TREES.

Para rubber.—A large number of seeds have been distributed by the Bureau of Forestry. The growth of young trees in the Moro Province has been very rapid. The quality of the rubber actually produced will not be known for a year or two more when trees are large enough for tapping. The tapping of undersized Para rubber trees gives a latex which has too large a proportion of resin. The trees should be six years old when tapped.

The following information relative to Para rubber is taken from a report on the cultivation of rubber by Dr. J. W. Strong;

In November, 1905, 20,000 Para seedlings were secured by the government of the Moro Province from the Forestry Bureau in Manila and were distributed, gratis, to American and native planters, and to the Farm at San Ramon. Para did not do well at San Ramon on account of soil conditions, but in many other parts of the Province, notably Basilan, Davao, and the foothills back of Zamboanga—it has made remarkable growth.

Para rubber (*Hevea brasiliensis*) is also being planted quite extensively in this Province, and is making fine growth. This rubber is propagated from seed entirely, and usually the seed are laid down in a nursery and transplanted when the plants have reached a proper size.

The Para seed does not retain its fertility very long (from 30 to 60 days), and no time taken of the Para rubber seedlings in the seed beds.

Seventy-five of the seedlings, raised from seed planted by the Forester on November 15, 1905, measured August 13, 1906, age 9 months, had an average height of 4 feet 2 inches, with a maximum height of 5 feet and 5 inches.

Measurements of the seedlings obtained by the government of the Moro Province from the Bureau of Agriculture at Manila, and transplanted into seed beds at the Farm, gave the following results:

Date of planting in boxes at the Lamao Forest Reserve, Bataan Province, Luzon, November 13, 1905 (?).

Date of transplanting into seed beds at the San Ramon Farm, January 5 to 10, 1906.

Date seedlings were measured, August 13, 1906.

Age of plants, 9 months. Number of plants measured, 75.

Average height, 3 feet 8 inches. Maximum height, 4 feet 7 inches.

The Superintendent of the Farm informed me that fully 1,000 of the 4,725 plants obtained from the Bureau of Agriculture failed to grow, after transplanting, on account of crooked taproots, caused by planting the seed in boxes containing but a shallow layer of soil.

In box planting, where it is expected to ship the seedlings, 6 or 8 inches of soil should be Superintendent had the plot cross-plowed with a 10 and 6-inch plow, and several weeks ago replowed the area with a 6-inch plow, and harrowed and disked it.

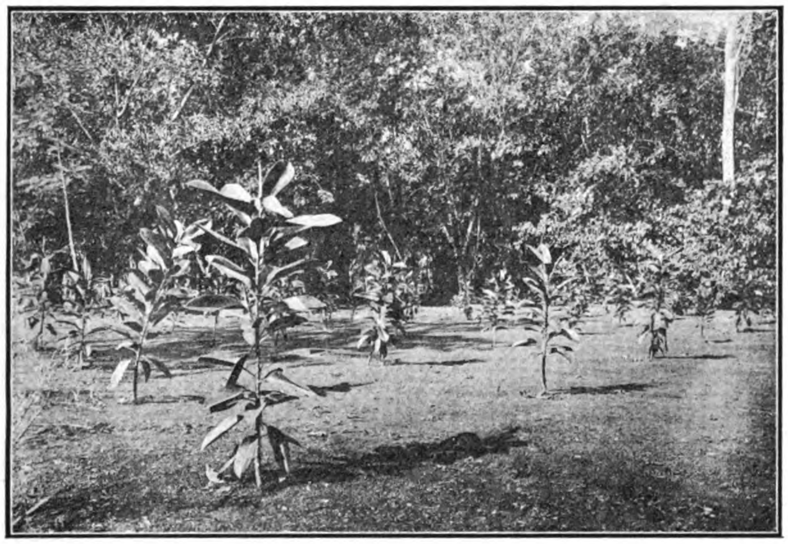
The planted area is situated about a half mile from the shore. The soil is a rich clay-loam, fairly porous, and containing but a few scattered boulders.

The seedlings were brought from the nursery to a shady spot near the planting area in large baskets, the roots being covered with earth. A "puddle" of clay and water was made in a bucket, and the plants, as needed, taken from the baskets, the roots placed in the bucket, which was carried to the hole where the plants were to be set. By using this method, the roots of the seedlings were protected from the drying influence of the air.

As the plants have been in nursery beds for nine months, it was almost impossible, on account of the length of the roots, to dig them out without injuring the tap root to some extent, and a number of failures will probably result from this cause.

Rows 18 feet apart were marked off, and the plants set every 18 feet in the row. It is intended that abaca shall be planted in between the rows of rubber.

As neither the Superintendent of the Farm nor the Forester knew how large seedlings should be treated when planted, it was decided to try the following methods:



PLANTATION OF INDIA RUBBER TREES, (FICUS ELASTICA), BUITENZORG, JAVA

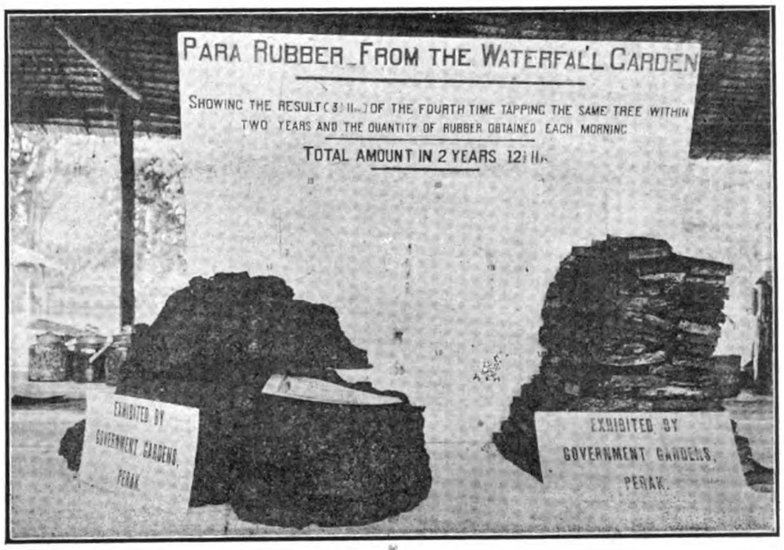


EXHIBIT OF PARA RUBBER, SHOWING YIELD OF TREES AND METHODS OF PREPARING FOR MARKET, PERAK, F. M. S.

should be lost in getting seed planted when received. No filing of seed is necessary and ants do not bother them.

Para is a very deep feeder and its early habit of growth seems to make it an ideal plant for planting through hemp. Planted through hemp 18 by 24 feet, at same time or soon after planting the hemp, it would in no way interfere for at least five years. After that time it would shade the ground considerably, but as it would be of tappable size in the sixth or seventh year at most, the hemp could be entirely removed, having paid all expenses and a good dividend in the meantime.

There is no doubt that the yield from mature Para trees is, as a rule, greater than from Ceara, and where the soil and rainfall are right Para is the rubber to plant.

Para is tapped, and the latex treated, in about the same manner as Ceara, the latex flowing more freely and not being so prone to coagulate spontaneously.

The following information on Para rubber is taken from a report of W. I. Hutchinson, of the Bureau of Forestry:

During a recent trip to the San Ramon Farm, made at the request of the Superintendent, in order to investigate the illegal clearing of lands in the vicinity of the Farm, measurements were placed in the bottom of the box. This will give the tap root a chance to develop and will not cause it to curl up in a spiral form.

Not more than 50 plants should be placed in a box 18 by 24 inches. The boxes received from the Bureau of Agriculture averaged 175 plants, and in many cases the roots and stem formed such a tangled mass that it was difficult to separate the plants without injury.

As an experiment, 18 Para seedlings and 14 Ceara seed were planted at the Farm on May 28, 1906, in the sandy soil 150 feet from the beach, where the underground water is more or less brackish. Only four of the Para plants are living at the present time (August 15, 1906), the remainder having wilted and died. A few of the Ceara seed sprouted, but the plants, after growing a few inches in height, gradually became less and less vigorous and finally died. This would seem to prove that Ceara and Para are not suited to land containing an excess of salt, or where the water is at all brackish.

During the writer's stay at the Farm, 300 seedlings of Para were set in a permanent plantation.

The land used for the plantation was cleared by the Spaniards many years ago. In 1904 it was plowed, but allowed to grow up to weeds again. In the spring of this year (1906) the

First three rows (66 plants) cut back to 18 inches and all leaves removed.

Fourth to sixth rows inclusive (66 plants), cut back a foot, but lower leaves not removed.

Remaining 8 rows (176 plants), new growth, formed during the last few weeks only, removed.

It is hoped that by trying these different methods, and watching the growth of the plants, some clew as to the proper treatment of large seedlings may be obtained.

The seedlings which were sold, on account of their large size, were placed in a box 18 by 24 inches, with the tops projecting over the end, the roots being covered with earth. A hood of abaca leaves was placed over the box, and instructions to water the plants during transit once a day, in the evening, tacked on the side. All the seedlings treated in this manner stood a several days' journey successfully.

Para rubber trees are usually tapped first when 6 or 7 years old, and continue to yield rubber indefinitely.

CASTILLOA RUBBER TREES.

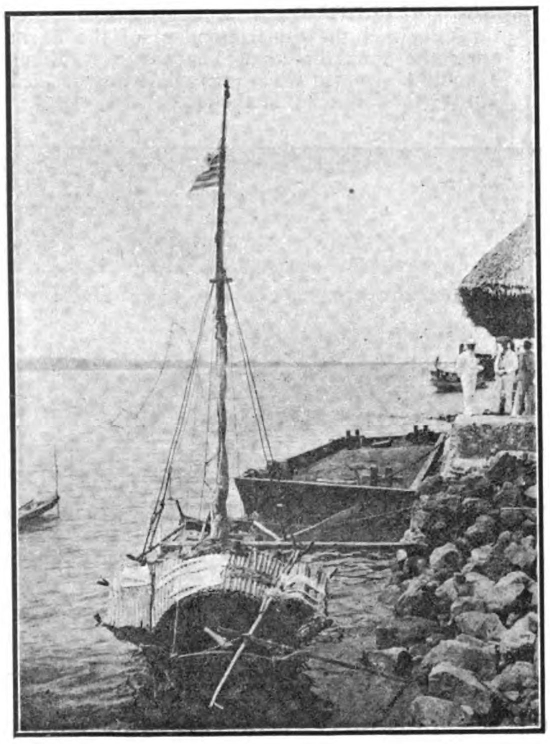
Castilloa elastica.—These trees are usually tapped first when 6 or 7 years of age, and continue to yield rubber indefinitely.

The following information on Castilloa rubber is taken from a report on the cultivation of rubber by Dr. J. W. Strong:

The first Castilloa brought into the islands was introduced by the San Rafael Plantation Co., of Basilan, in 1905, and has made phenomenal growth; some of the trees measuring 32 inches in circumference 1 yard from the ground, with a corresponding height and crown. Castilloa is perhaps the most handsome of the three rubbers now growing in the Province.

This rubber has not been planted so extensively as either of the other two, Davao District and Basilan having a few thousand. It is making wonderful growth in both localities, and will probably be more extensively planted. Castilloa has not been a general favorite in the East, as it does not come into bearing until 8 or 10 years of age and its rubber is hardly up to the standard of either Para or Ceara. It is propagated from seed, and stands transplanting better than either Para or Ceara. It may be propagated by cuttings but this is hardly practicable.

The tapping and coagulating of Castilloa latex is different from Ceara or Para, and need not be commented on.



CHINESE TRADING BOAT COLLECTING GUTTA PERCHA AT PARANG PARANG

CONDITIONS IN SOUTHERN ISLANDS.

Referring now specifically to the questions of your correspondent, rubber plantations might be located on the Agusan River, in the subprovince of Butuan, in the subprovince of Bukidnon, in the Moro Province, and anywhere in the southern half of Palawan without serious danger from heavy wind storms, and with all other conditions of climate and soil favorable. The elevation above sea level would be so slight as to be negligible, except in the subprovince of Bukidnon, where the maximum elevation available would be 3,000 feet, this being the height above which it is not deemed desirable to plant Ceara rubber.

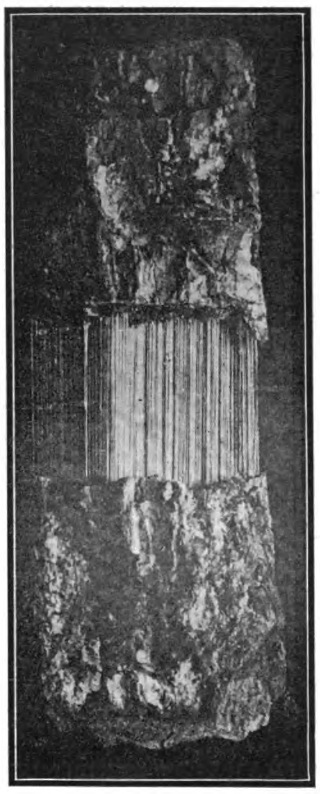
The largest number of acres which a corporation which is authorized to engage in agriculture can control would be 2,500, and this amount of land could be purchased outright or leased. If purchased, the cost would be not less than P 10 per hectare, which would probably be the actual cost price if wild land was taken.

Payments for land purchased from the Government may be made as follows: Twenty-five per centum at the time bid is submitted, and the balance may be paid in full upon the making of the award, or may be paid in one installment at the expiration of five years from the date of the award. All sums remaining unpaid after the date of the award bear 6 per centum interest per annum from such date until paid. The purchase can be completed only after five years of occupation and cultivation.

The annual taxes would be one-half of 1 per centum of the value of the property.

If land is rented, the cost of a 2,500-acre tract would be approximately as follows: Survey Bureau of Lands, P 300 to P 600, depending upon the difficulty of clearing the land. In the subprovince of Bukidnon, the cost of a survey should not exceed P 150, as little or no brushing out would be required. The rental on a 2,500-acre tract would be approximately P 530 per year, payable in advance. There would be no taxes on the land.

Transportation in the subprovince of Butuan would be by the Agusan River to the town of Butuan; thence by local steamer to Cebu. The Agusan River has, for a distance of more than



A PIECE OF DRY BARK FROM A RUBBER VINE, BROKEN AND PULLED APART, SHOWING THE IMMENSE NUMBER OF RUBBER FIBERS.

100 miles from its mouth, a minimum depth in dry weather of 3 feet, and any concern owning a rubber plantation on the river would, of course, need to operate its own launch.

It may interest you to know that the Province operates a 30-foot launch on this river. It is capable of carrying 50 sacks of rice on a 20-inch draught. It has a 7½-horsepower Mietz and Weiss petroleum engine; has a speed of 10 miles per hour, and costs to operate approximately P8 per day of 10 hours, including salary of native engineer.

The cost of freight from Butuan to Cebu, and from Cebu to the world's markets, is doubtless better known to the Manila Merchants' Association than to me, and at all events can readily be ascertained.

The soil in the Agusan River Valley is a rich loam made up from the wash of the immense forests through which the river flows.

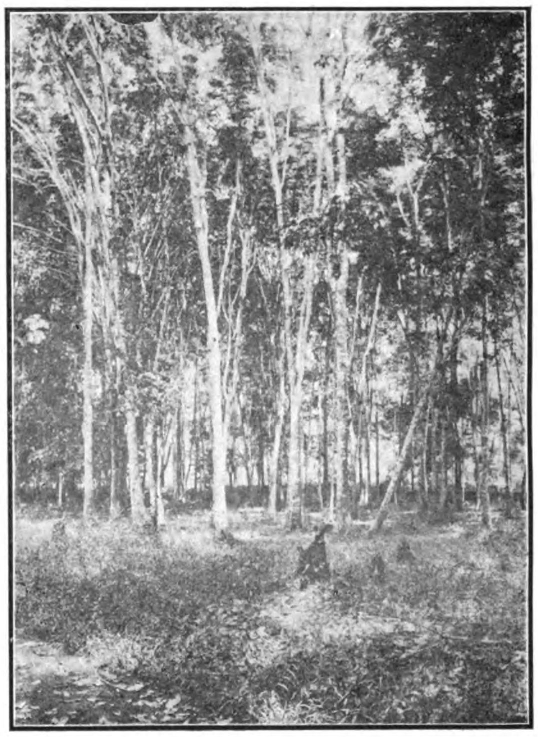
The following report by Mr. C. B. Robinson, Economic Botanist of the Bureau of Science, embodies the latest information which I have been able to obtain relative to rubber growing in the Moro Province:

RUBBER INVESTIGATIONS IN MORO PROVINCE, JUNE, JULY, 1910.

The writer was detailed from this Bureau to accompany Mr. C. A. Littler, representing a firm of British capitalists, who contemplated establishing a rubber plantation at some point in the islands that should prove suitable, where also there would be accessible a good supply of rubber and gutta-percha, obtained from wild plants. Mr. Frank E. Bost, a rubber specialist and the manager of the proposed plantation was also of the party, to which was added at Zamboanga, Mariano, the Forestry Ranger for the District. Great assistance was given by the officials of the Moro Province, and of the District of Cotabato.

It was therefore the aim of the expedition to see as much as possible of the places where the planting of rubber had hitherto been attempted, and to inspect localities which from extended inquiries seemed likely to prove suitable for a plantation.

Leaving Manila late on the afternoon of June 3, with stops at Dumaguete and Cebu, Zamboanga was reached on the 9th; San Ramon was visited on the 10th, and a more



PLANTATION OF PARA RUBBER TREES, PRODUCING SEED BOTANICAL GARDEN, SINGAPORE

extended trip to Basilan was made on the 15th, with stops at Margosatubig, and Malabang, and a change of boat and overnight stop at Parang on the 16th-17th. Cotabato was reached at noon on the 17th and finally left on July 2, the trips in the mountains extending as far up the valley as Fort Pikit, and through the Liguasan March from Cabacsalan to Cotabato. The return steamer was taken on July 2 at Parang, and followed through her route to Zamboanga, Jolo, Port Banga, Dumaguete, and Cebu; Manila being reached before noon on the 10th.

The general results arrived at were that a site for the proposed plantation was found near Reina Regente, Cotabato; that all the three kinds of rubber-yielding trees which have been planted, Ceara (*Manihot glaziovii* Muell.-Arg.), Para (*Hevea brasiliensis* Muell.-Arg.), and Castilloa (*C. elastica* Cerv.), were found to make very satisfactory growth, but the first is so subject to injury, that its planting is being abandoned by those who have tried it most extensively; that a fairly large quantity of rubber (chiefly gutta-percha, the true rubber not being distinguished locally) is brought

down the Cotabato Valley, though at present the supply is erratic, owing to the uncertainty of a market; several species of Ficus were found which upon rough testing proved to yield a certain amount of rubber. More extended observations follow:

SAN RAMON.

Near the buildings at San Ramon, there are young seedlings of Para, perhaps 200 in number, about 1 meter in height. The older trees are few in number, about 1 kilometer from the station in an easterly direction, near the Sax River; no cultivation has been given them, the tallest is about 6 meters and nearly all have been more or less injured.

BASILAN, DR. J. W. STRONG'S PLANTATION.

This is situated a little over 1.5 kilometers from Isabela, and is by far the most extensive rubber plantation seen, and to the best of our information equally the most extensive existing in the islands. A rough plan is appended.

Originally, Ceara was almost exclusively planted followed quickly by Para and Castilloa. While the first has grown well and many of the trees have reached a size suitable for tapping, it is so liable to injury from wild hogs, deer, and termites, that it is being superseded by the other species.

Measurements made at Dr. Strong's gave the following results. All are the circumference in inches, 3 feet above the surface of the ground. The growth of the Castilloa is especially remarkable.

Para, 4 years 6 months, 23, 23.5, and 22.

Para, 3 years 6 months, 16, 15, 11, 12.5, 13, 15.5, 12, 15.5, 13.5, 10, 16 and 15.5.

Castilloa, 3 years 10 months, 34, 35.5.

Castilloa, 2 years 10 months, 27, 22, 24.5, 25.5, 24, and 24.5. (There are 35 trees of this age, all bearing seed.)

Ceara, 2 years from cutting, 18.5.

Both the climate and the situation of Basilan are suited to rubber growing. Drawbacks exist in the wild hogs and deer; these can be kept out by suitable fencing.

Experimental tappings of rubber have already been made, with satisfactory results.

SAN RAFAEL PLANTATION, BASILAN.

This is situated about 3 kilometers west of Dr. Strong's, with which it is connected by a trail. The hacienda contains about 300 hectares. A number of the older trees are planted near the house. Measurements made of these gave the following figures:

Ceara, 5 years, 32, 39, 33, 33, 31.

Castilloa, 3 years 10 months, 28, 22.5, 26 (200 of this age).

There are said to be on the place 900 to 1,000 Ceara trees, 3 years old, and 100 to 200 Para, all small, 3 years old. There has been no cultivation, and injury has been experienced from hogs. None of the trees have been tapped, although some of them are quite of sufficient size.

MARGOSATUBIG.

There are two small plots of Ceara on opposite sides of the road in the place, about 3 years old, making good growth, one man having 25 trees.

BULUAN. (DATTO INUK.)

Beside the house of Datto Inuk at Buluan, there are some 35 Ceara trees, about 2.5 years old, planted very closely, about 1.5 meters by 1.5 meters. These are entirely free of weeds. Measurements same units as before; 16.5, 16, 12, 13.5, 17.5, 13.25, 15, 17.5, and 17.25. In addition, there are about 1,000 Ceara trees, 10 months old, in the hills at some distance, planted about 2.7 meters by 2.7.

PORT BANGA.

Mr. Redding of the firm of Williamson & Redding stated that at the head of the bay they had planted a considerable number of trees; that these had been planted and left without cultivation, and were a total failure. They are now planting and cultivating, but this has only recently been undertaken.

OTHER PLACES IN THE ZAMBOANGA DISTRICT.

Several other planters have rubber trees; the work has apparently not included cultivation, and the results attained are meagre. None of these were visited.

WILD RUBBER

The chief supply of this comes from the Cotabato Valley, either from the head waters of the Rio Grande, or from the hills along one of its branches, the Dansalan, where three Indians of whom Bombay is the chief, gather an amount practically limited by their financial resources. It is chiefly obtained by the hill tribes, and comes out through Cotabato; some also is said to be exported through Sarangani.

Datto Piang's estimates of the quantity he could procure ranged from 400 to 500 piculs every three months; he formerly got 700. A small quantity comes from the Buluan country; the rest is divided between the Dansalan, and the headwaters of the Rio Grande, as stated above. Bombay gets about half of the Dansalan output, but at present little or none, owing to the uncertainty of payment. Prices there range from 12 to 30 pesos per picul (137.5 pounds). A fairly large lot was seen at Cotabato, whence it is exported to Jolo; the dealer there was also seen, and it appears that no cleaning is done except washing, first in hot water, and then working with the feet in cold water; it is then sent to Singapore where there is a machine. The export from Cotabato for the 11 months of the then current fiscal year (ending May 31, 1910) was nearly 87,000 kilograms.

Small quantities are exported from Margosatubig to Zamboanga, one dealer sending about 5, and another 2.5 piculs per month. This is obtained from the Camaralang River.

No distinction is made between gutta-percha and vine rubber,* but the great bulk from description and the samples seen is of the former. The vine rubber does, however, form a part of the export, but it is more difficult to obtain, and has brought no higher prices.

SITES FOR RUBBER PLANTATIONS.

With this is involved the labor problem.

Along the banks of the Rio Grande, the land is too low and too wet for rubber planting, except in a few places. The best of these seemed to be in the vicinity of Reina Regente, where the south side of the river is approached by rolling hills, well-wooded attaining elevations of 60 to 100 meters. The town of Dalauan (Datto Piang) is a few miles below, and the prospects of obtaining a sufficient supply of labor through his co-operation seem to be good. Good land is said to be available above Pikit, but the transportation problem so far up the river would be too great, and the supply of labor insufficient for work upon an extended scale. A limited amount of good land could be found on the southern arm of the river, hardly sufficient for the purposes desired.

C. B. ROBINSON,
Economic Botanist.

ESTIMATES OF EXPENSE AND PROFIT.

Practically all available land is now covered with timber. This of course at once raises the amount of the cost of clearing. The difficulty involved in obtaining really reliable information relative to the cost of clearing land, the cost of planting, and the returns derived from catch crops affords the true explanation of my long delay in replying to your letter.

The following is an estimate furnished me by the Director of the Bureau of Agriculture:

Cost of clearing land.—The cost of clearing heavy jungle is estimated to be about P20 per acre, this includes the slashing, cutting of trees, burning and disposal of the larger trunks.

The cost of clearing average jungle is estimated at P16 per acre.

The cost of clearing open jungle is estimated at P12 per acre. (Estimated by hemp growers.)

Cost of planting three principal kinds of rubber per acre.—An idea can be had of this by giving the estimated cost for Para rubber in the Malay Peninsula, as estimated by R. G. Watson:

Estimate for 1,000 acres; 250 acres to be opened each year.

First year:	
Premium	P3,000
Survey fees	1,000
Rent	1,000
Clearing, felling, and burning 250 acres (P15 per acre)	3,750
Lining, holing, and planting 250 acres (P6 per acre)	1,500
Plants	800
Roads and drains (P6 per acre)	1,500
Houses for laborers	2,000
Lines	1,500
Medical—Hospital, medicines, etc.	2,000
Labor—Advances, immigration, etc.	1,500
Superintendence	3,600
Tools and sundries	1,000
Total	24,150
Second year:	
Rent	P1,000
Clearing, felling, and burning 250 acres	3,750
Lining, holing, and planting 250 acres	1,500
Plants	800
Roads and drains	1,500
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	750
Weeding 250 acres	2,500
Supplying	100
Total	17,900
Third year:	
Rent	P1,000
Clearing, felling, and burning 250 acres	3,750
Lining, holing, and planting 250 acres	1,500
Plants	800
Lines	1,500
Roads and drains	1,500
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 500 acres	6,000
Supplying	100
Total	23,150
Fourth year:	
Rent	1,000
Clearing, felling, and burning 250 acres	3,750
Lining, holing, and planting 250 acres	1,500
Plants	800
Roads and drains	1,500
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 750 acres	12,000
Supplying	100
Total	27,650
Fifth year:	
Rent	1,000
Roads and drains	800
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	15,000
Total	23,800
Sixth year:	
Rent	P1,000
Roads and drains	800
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	17,000
Total	25,800

Seventh year:

Rent	4,000
Roads and drains	800
Medical	1,000
Labor	1,000
Superintendence	4,000
Tools and sundries	1,000
Weeding 1,000 acres	17,000
Total	28,800
Eighth and following years as seventh year	28,800

The cost of weeding gradually decreases till in the eleventh year it is practically nil.

Profits.

Seventh year:

250 acres, planted 150 trees per acre at 1 pound rubber per tree, sold at 3s. per pound	P48,214
250 acres, planted 150 trees per acre, at 1¼ pounds rubber per tree	72,231
Total income	120,535
Less cost of production, shipping, etc., of 93,750 pounds at 1s. 6d. per pound	60,268
Net profit	60,267

Eighth year:

250 acres at 1 pound per tree and 3s. per pound	48,214
250 acres at 1¼ pounds per tree and 3s. per pound	72,321
250 acres at 2 pounds per tree and 3s. per pound	96,428
Total income	216,963
Less cost of production, etc., 253,125 pounds at 1s. 6d. per pound	108,482
Net profit	108,481

Ninth year:

250 acres at 1 pound per tree and 3s. per pound	48,214
250 acres at 1¼ pounds per tree and 3s. per pound	72,321
500 acres at 2 pounds per tree and 3s. per pound	192,856
Total income	313,391
Cost of production, etc., 243,750 pounds at 1s. 6d. per pound	156,696
Net profit	156,695

Tenth year

250 acres at 1¼ pounds per tree and 3s. per pound	P72,321
750 acres at 2 pounds per tree and 3s. per pound	289,280
Total income	361,601
Less cost of production, etc., 262,500 pounds at 1s. 6d. per pound	180,800
Net profit	180,801

Eleventh year:

1,000 acres at 2 pounds per tree and 3s. per pound	385,710
Cost of production, etc., of 300,000 pounds at 1s. 6d. per pound	192,857
Net profit	192,853

And so on each year, annual profit P192,853, with a probability of still increased yield.

This estimate would apply to Castilloa and Ceara, as there would be very little difference in the cost of seed or young plants.

Cost of going over once with bolo, cutting weeds and brush, P4 per acre.

Returns from catch crops.—The amount of these crops, such as corn, sweet potatoes, casava, etc., that can be grown per acre will depend somewhat on the way the trees are set out. Some planters advise that the rubber trees be originally planted 15 feet apart, the object of this being to cover the ground with shade as soon as possible to prevent the growth of weeds and underbrush. Three or four tappings can be made on these trees before they crowd to such an extent that it will be necessary to take out the surplus trees, leaving the trees in the permanent grove 30 feet apart. In case the trees are planted 15 feet apart, only a very small portion of the land could be planted to catch crops, as in cultivating it will be necessary to leave a strip 6 feet wide along each row of trees to prevent injury to the trees in cultivating. If the trees, however, are set out originally 30 feet apart, the intervening spaces may be occupied by catch crops, provided there are markets for such crops as are grown. Only about 85 per cent. of the total area should be considered available for catch crops.

Corn should yield about 30 bushels per acre, worth in Manila P1.10 per bushel. Sweet potatoes should yield from 100 to 200 bushels per acre, depending upon the character of the soil and the kind of cultivation. This crop is more or less perishable, but large quantities could be used for feeding laborers. Some hemp planters have claimed that they have grown a sufficient quantity of sweet potatoes between the rows of hemp to pay for the cost of weeding the hemp each year. Casava will yield from 20 to 30 tons of roots per acre. Up to the present time it has not been found profitable to grow casava, owing to the fact that suitable market cannot be found in the Philippine Islands for the starch and when shipped to New York the cost of manufacture and transportation about equals the price obtained.

Cost of clearing, plowing, and harrowing.—Cost of plowing loose sandy soil covered with cogon once, P3 per acre. Cost of harrowing, P1 per acre.

A person who has a cocoanut plantation in northern Mindanao on cogon land claims that it is necessary to plow the land each year and harrow at least once a month in order to keep down the cogon, unless some crop is grown between the trees, in which case the cultivation of the crop should be sufficient to keep down the weeds and vines. It was suggested to this person that he plant the intervening spaces in velvet beans and keep the velvet beans from destroying the young trees by having a man go over the ground at least every two weeks and chop off all vines approaching the trees. The cost of this need not exceed P0.20 per acre for each time.

Cost of seed.—Ceara rubber seed should not cost over P2 per 1,000 in large quantities. Allowing 250 seeds per hectare, the cost for seed would be P0.50.

The following estimate of the cost of clearing land and planting it in coconuts, and of the profits derivable from the sale of forestry products and from catch crops has been furnished me by Mr. C. H. Lamb, Superintendent of the Iwahig Penal Colony. So far as concerns the cost of clearing for coconut planting and the profits derivable from catch crops, these figures will answer as well for rubber as for coconuts. It should, of course, be remembered that mangrove land is not suitable for rubber production.

The island of Palawan differs geologically and geographically from other islands in the Philippine group.

It is different in its fauna and flora, and in its rainfall, and to quite an extent in its seasons.

Peculiarly, good hemp will not grow in many localities, nor will some other plants which thrive on other islands, due probably to the topography of the country.

The soil is varied, and in fact, over the greater portion of the island the soil which is feasible of cultivation differs in character, even in small areas which can be described by the word patchy.

There are two crops, however, which thrive well on the island of Palawan, where the land is at all susceptible of cultivation; same are rice and coconuts. The same statement can almost be made as regards corn. (The average corn yield is as good as the writer has seen anywhere, with the exception, that frequently patches of soil are found on which corn does not thrive, but peculiarly the same soil will grow good rice, and it will also grow good coconuts.)

The expense of preparing land for cultivation must always depend to a certain extent upon the manner or method, and particularly upon the location. The following figures can be accepted as a safe guide:

Felling trees will cost from nothing to P20 per hectare.

Cutting and burning will cost from P10 to P80 per hectare.

Stumping will cost from P10 to P150 per hectare.

The first plowing will cost from P3 to P10 per hectare.

Three plowings will cost from P5 to P20 per hectare.

Planting in either corn or rice will cost from P4 to P10 per hectare.

Taking into consideration all classes of land found; the level, rich, short grass land, free from timber and brush, which has only to be plowed, and which may be called first-class land. Second, the small valleys along the streams and in the mountain coves, almost always covered with forest more or less heavy, and which may be called second-class land. Third, the same kind of land covered with "bojo" or small brush, which may be termed third-class land. Fourth, particularly unfavorable locations, which may be termed fourth-class land.

Classification is made, considering that the best, which can be planted at the least expense.—It has been found by actual experience that the minimum average for planting the first crop of rice or corn is P32 per hectare.

The general average is P85 per hectare. This is a safe and conservative estimate, and will be found sufficient, taking into consideration all conditions.

The expense of P85 is divided as follows:

(*a*) Felling trees, P5.
(*b*) Cutting and burning, P20.
(*c*) Digging stumps, P40.
(*d*) For plowing, P14.
(*e*) Planting, P6.

If misfortune and unfortunate incidents come this average will still be found ample. However, to cover same, an additional allowance of P15 per hectare is made, which would make a maximum total of P100 per hectare.

Ordinarily through the island of Palawan, if forest land is cleared and planted, from 10 to to 100 "trozos" can be had from 1 hectare of land. Same will average from 300 to 2,000 cubic feet, which will net from P40 to P400.

A safe and conservative amount as a return from 1 hectare of land is P110.

The minimum return from 1 hectare of land in rice harvest is 20 cavans, and the average maximum is 50, although 70 is not uncommon.

The average value of this rice or palay is P2.55 per cavan.

Therefore, the return from the rice crop from 1 hectare of land will average P40 to P125.

Forty-one pesos is assured, therefore 1 hectare of land cleared of ordinary timber and planted in rice will yield the first year P151, i.e., P110 in timber and P41 in rice or corn.

This same hectare of land, according to above figures, has been planted at a maximum cost of P100, thereby giving us a margin of P51 per hectare.

Regarding mangrove swamp, what I carefully compiled from actual experience shows that the firewood and tanbark therefrom can invariably be depended to pay the cost of clearing the land and planting.

* * *

The foregoing data are the basis upon which the writer works, or in other words, it can be assumed that throughout the island of Palawan the first quick return crop will pay for the clearing of the land, and on at least 50 per cent of the locations will also pay for the planting of the land in coconuts. The planting of the nuts will cost from P6.25 to P12.50, or 22½ cents per tree, or a maximum cost of P22.50 per hectare. However, it is usually done for less, and this is the maximum average. Also the quick return crop which has been planted on the land will produce a profit over the clearing

of P22.50 per hectare, sufficient to pay the expenses of planting the coconuts, which are usually planted at about the same time rice is planted.

The same land will produce two more quick return crops, that is, three quick return crops in all, without interference with the coconuts.

The best crops, according to the writer's experience, are, first, a crop of corn, subsequently two crops of mountain rice, by which time coconuts will be too large to permit any further cultivation of rice or corn, but camotes and so forth may be planted. However, the latter are not considered a profitable crop. If the first quick return crop does not produce sufficient revenue to pay the expense of planting the coconuts, the planter has a maximum expense of 22½ cents per tree. There will be no additional expense for the next two years of the tree's life if quick return crops are planted; on the contrary there is usually a profit. However, if the second and third quick return crops are only sufficient to pay the expense of keeping the land clean, there are really only three years to care for the trees before they begin to bear. Experience has shown that this expense will average 10 cents per year per tree, provided not less than 2 hectares are planted, actual data was based in one instance on 5 hectares, and in another on 10.

This results in a cost of 30 centavos per tree in addition to the original investments, or expense of 22½ cents per tree, making a total of 52½ cents per tree from the data of planting to the bearing age.

This is the maximum average, and unless caused by ignorance or mismanagement, should not be greater; in 50 per cent of the locations it will be less. However, it is not safe to figure on less for any location along the foot of the mountain ranges where jungle and forest must be coped with.

Cost data taken from actual experience, and handled in a different manner, have given the writer practically the same results, and in different parts of the Philippine Islands has ranged from 60 cents to P1.85 per tree, brought to the bearing age.

The most favorable conditions which the writer has ever encountered on Luzon show that coconuts have been grown, that is, brought to the bearing age, which there is 7 and 8 years, for 60 cents per tree.

However, in that particular place the conditions were absolutely favorable, and the low cost was *due to the clever and economic administration of the planter.* Adjoining planters expended on an average of from P1 to P1.50 per tree, to bring the trees to the bearing age.

These same remarks will apply to the island of Mindanao. The maximum reliable statement is P1.85 per tree; however, the estimate provided for a most expensive administration.

The writer's cost data are all based upon 50 cents per day for labor, and do not include road construction, except trails and earth roads for carts, "kangas," and so forth. This is due to the fact that coconut planting has been done either on the coast or in the vicinity of navigable rivers, of which Palawan has many.

The conclusion reached, from the writer's experience, is that coconut planting for a permanent crop and investment can not be equaled by any other known permanent crop, not even rubber. It is superior to rubber in the island of Palawan. The usual argument advanced to the contrary places great value upon the fact that Palawan does not have typhoons which would damage the rubber crop—the same fact is almost of equal value to the coconut.

The attached notes regarding this feature are taken from general conditions, and not from especially favored localities.

AGUSAN RIVER VALLEY.

Comparatively little labor is to be had in the Agusan River Valley, and it would probably be necessary to bring most of that required from Iloilo. If no catch crops were planted, the land after being cleared should be gone over with bolos twice each year. It should be remembered that where Ceara rubber is planted it is nearly useless to put in a catch crop, as the rubber itself promptly occupies the ground. If Para or Castilloa is planted, such crops as corn, camotes, peanuts, or sesamum can be put in. It is impossible to state definitely the returns which would be derived, so much depends upon proper cultivation methods and good management. I am frank to say, however, that if I were to plant rubber in the Philippines, I should, in the light of my present knowledge, plant Ceara rubber, and make it that and nothing else on the ground planted with rubber, devoting other ground to the growing of crops which give quick returns.

It should be stated that much of the land in the Agusan River Valley is apparently admirably adapted to the growing of tobacco and that there is every theoretical reason to believe that excellent tobacco might be produced there but tobacco, like Ceara rubber, is a voracious feeder, which quickly impoverishes the soil.

BUKIDNON.

In the subprovince of Bukidnon the cost of transportation would, of course, be the ordinary cost of overland transportation by cart, and would depend directly on the distance, which might be anything from 10 miles to 120 miles, depending on the location which the planter chose to select. The products would need to be taken across the bay to Cagayan de Misamis, and be shipped thence to Cebu, although a pier might be built on the east coast of the bay, and the small cost of transportation across the bay saved.

Character of soil: Good, rich loam, in some places sandy, and in others clayey. Practically nothing but grass is at present on the land and there would be no cost for clearing, as the grass could be burned during the comparatively dry part of the year. The cost of planting would be very small, as the land would require only plowing and harrowing. The expense of maintenance, which would consist of occasional replowing and harrowing, would also be small.

Probably the best catch crop to grow on this land would be upland rice, as the country does not now produce enough rice to feed its people, owing to the scarcity of draught animals. The land should produce 30 cavans of unhusked rice per acre, worth P3 per cavan. The additional cost involved in putting in this rice would be practically nil, as the land would need to be plowed in any event, and the rice could be drilled in.

SOUTH PALAWAN.

The conditions as to land are the same as in Agusan.

Transportation facilities: A small steamer every three weeks from Puerto Princesa to Manila. Land might be had in the immediate vicinity of Puerto Princesa, and communication with that town maintained by launch, as the land selected would naturally be adjacent to the sea shore. The soil in south Palawan is perhaps the richest in the Islands, with the exception of that in Mindanao and Mindoro. Land can be selected which is now covered with grass, or with a comparatively light growth of bushes. This land is very suitable for raising upland rice, corn, camotes or sesamum.

MORO PROVINCE.

I am not myself sufficiently familiar with conditions in the Moro Province to give any reliable information, but such information can doubtless be had from the Provincial Secretary or from the officers of the Zamboanga Chamber of Commerce. They are progressive people down there and I am sure they will be glad to help out in any way they can.

With a few more years of experience it is to be hoped and anticipated that much more detailed information relative to rubber growing in the Philippines may be obtainable. At present we must fall back upon the fundamental proposition that conditions as regards climate and soil are ideal and that labor is to be had in a reasonable amount, and that the ultimate result will depend here, as elsewhere, on the character of the management.

GLOSSARY.

Picul =137.9 pounds avoirdupois.
Cavan =16 gallons 3 quarts 1 pint.
Meter =39.37 inches.
Kilometer=0.62137 mile.
Kilogram =2.2046 pounds avoirdupois.
Hectare =2.471 acres.
Abaca is Manila hemp.

The peso (P), Philippine currency, is equivalent to 50 cents United States currency, and the centavo is equal to ½ cent. Except where gold is specified, the amount is expressed in Philippine currency.

TRADE BOOMING IN THE PHILIPPINES

A favorable net change in the trade balance of the Philippine Islands is shown by a statement issued early in June by the bureau of customs, which covered the first ten months of the present fiscal year. The imports for the first ten months of the present fiscal year amounted to P86,691,858 as compared to P84,484,568 in the corresponding period of the previous fiscal year. This is an increase of over two million pesos. The exports, however, for the period in question amounted to P84,376,656 while in the previous year during the ten months the total was P64,520,102. Thus there was an increase in exports of P19,856,554 against an increase in imports of P2,207,290 figures which are in every way satisfactory. It is true that the trade balance is still against the Philippines but there has been a favorable net change and had it not been for abnormally heavy importations of rice the balance might easily have been on the other side. The total trade of the Philippines for the ten months of 1912 was P171,068,514 against P149,004,670 last year, an increase of P22,063,844.

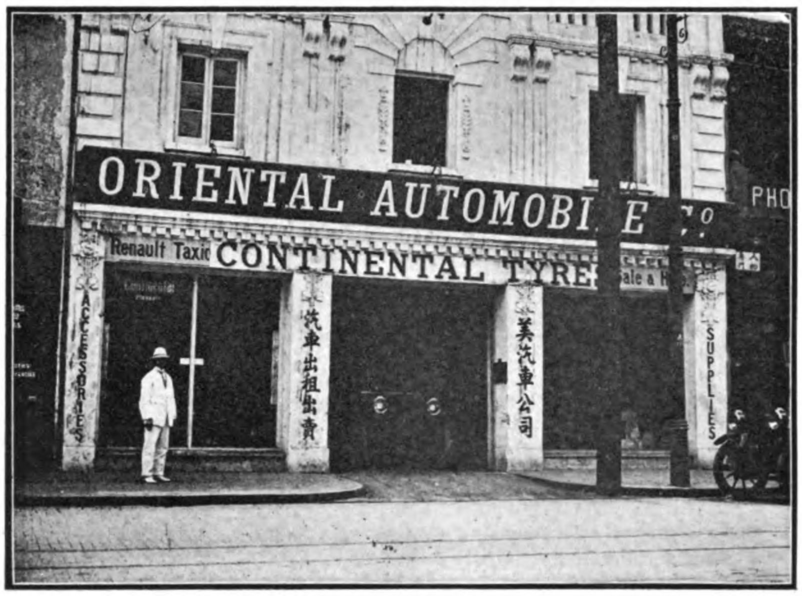
There was a healthy increase in the trade between the Islands and the United States. The exports to the United States increased by P6,261,941 and the imports by P995,812. In 1912 the total trade with the United States was P70,915,314 as against P57,395,620 in 1911. Thus nearly fifty per cent of the total trade of the Philippines was with the United States.

"VIA SIBERIA"

The improvements on the Trans-Siberian road that have already been made are many, and more are promised. There seems to be no limit to the laudable ambition of the Russian railway authorities in this direction. They are now holding out the prospect that before many years are over trains will be able to cover the distance from St. Petersburg to Vladivostok in six days. While that is a matter for the future, during the present summer the time of the express trains will be considerably shortened. The outward express, from Moscow to Vladivostok, will take 8 days 17 hours, 35 minutes, while from Vladivostok to Moscow the time will be 8 days, 11 hours, 35 minutes. There is naturally also a reduction in time from St. Petersburg. The outward journey to Vladivostok will occupy 9 days 2 hours, and from Vladivostok to St. Petersberg 9 days 4 hours, 40 minutes. The ordinary passenger trains will take 12 days 12 hours on the journey from Moscow to Vladivostok, and on the homeward trip 11 days 12 hours. Next year it is anticipated that a further reduction in the running time of 24 hours will be made.

With the South Manchurian Railway also steadily improving their service business men in the Far East will continue to save further appreciable periods of the time which now, more than ever before, is a synonym for money.

MOTOR CAR INDUSTRY OF THE FAR EAST



TWO OF THE LEADING GARAGES IN SHANGHAI

Probably no other industry has made greater strides, or made more noticeable progress in the Orient, than that connected with automobiles. Probably no other section of the world offers more obstacles to be overcome by this industry than China. Here is a country where good roads have been a long way from the ambition of the people, where generations upon generations have demanded hardly more than foot paths, where the wheel-barrow has been used for all overland transportation, afterwards to be supplanted by the ricshaw, or the old horse cart. Consequently the motor car boulevard has never been thought of, nor, indeed, has any sort of road for wheeled vehicles ever seemed worthy of maintenance. However, it is interesting to note the remarkable changes that have been taking place in the past few years. Along with the foreigner comes the motor car and the idea of something better than a crooked narrow alleyway which the Orientals have always been prone to call streets. Especially where the foreigner is located, have the extensions of the cities been tending toward reasonably wide thoroughfares properly kept.

The foreign population of the large Oriental cities is so cosmopolitan that cars of practically all motor car manufacturing countries are to be found. In the city of Shanghai alone can be found almost five hundred automobiles running under French and English licenses. The total number of different makes is about seventy and is as follows—American—Cadillac, Hupmobile, Hudson, Ford, Maxwell, Columbia, Oldsmobile, Reo, White, E.M.F., Rambler, R.G.H., Flanders, Winton, Marmon, Pullman, Buick, Chalmers-Detroit, and Overland. The English cars are Daimler, Argyle, Humber, Swift, Star, Beaufort, Austin, Crossley, Napier, Rover, Standard, Siddeley, Singer, Cleamont-Talbot, Vulcan, Arrol-Johnson, Allday and Onions, Belovie, Adams, Vauxhall and Sheffield-Simplex. The French cars are, Renault, Prima, Hotchkiss, Unic, Mors, Rochet-Schneider, Delaimay-Bellville, Gregoire, De Dion, Peugeot, Le Gui, Berliet, Brasier, Panhard, Delage, Darraq. The German cars are Opel, N.A.G., Otto Beckman, Lloyd, Mercedes, Stoewer, Protos, Adler. Italy is represented by the S.P.A., Switzerland by the Turicum, Belgium by the Metallurgique, and Holland by the Spyker.

It is particularly interesting to note the great number of landaulette cars that may be seen on the streets, and it is certain with so many different makes represented, the prospective buyer has sufficient samples from which he may form an opinion of the kind of car he wants. The prejudice which has always seemed to exist in reference to other manufactured goods seems to be dying away when it comes to the motor car and the Englishman who formerly would not ride in anything except an English made car, no matter how noisy or out of proportion it appeared, can now be seen riding in a French or American car as often as in a car from his home land, and the Americans or Frenchmen or Germans seem to be buying their cars from a point of view which suits their particular need rather than in encouragement of the manufacture of their home country. The Chinaman is in a position to make an unprejudiced selection, and in most cases it will be noticed he is seen gliding along the crowded streets or the country roads in an American machine.

In Shanghai we are so located as to judge just what progress the world is making in automibile manufacture. The lines of the body and the construction of the engine and the working parts of the motor car a few years ago were far from the same in idea, while now it can be noticed with interest that the French, German, English, and American cars are taking on a similar appearance and the general make up of the engine is becoming more standardised.

When one stops to think of the great number of cars running on the streets of Shanghai, with a foreign population of about 12,000, and remembers that these cars are practically all owned by foreigners one must be impressed with the great possibility for the sale of cars when the Chinese population of about 1,000,000 —among whom there are to be found so many immensely wealthy Chinese—is seized with the ambition to own motor cars.

From the Motor Car manufacturer's point of view, there is an unlimited amount of business to be done some day, and it will not be done with the foreigners either, for the Chinaman is proving himself to be a great lover of the automobile, and although he was not inclined to jump from his wheel-barrow ideas to that of the motor car without due consideration, it is gratifying to note how he has been taking advantage of the opportunity of renting cars. The introduction of the taxicab by the Oriental Automobile Co., of Nanking Road, has placed the cost of a motor ride so low in price, that the Chinaman is found to be its best supporter. When the Chinaman discovered that he was able to board a taxicab, and enjoy the fresh air and the pleasing scenery of the surrounding country, at the cost of a few Mexican dollars, he immediately began to see the practicability of the motor car, as well as the great amount of pleasure to be derived in owning a car. Although the enterprising American firm which introduced the taxicab into the Orient was very likely planning upon good business for the present, still the amount of benefit which the taxicab will do for the motor car industry in general in the Far East cannot fully be estimated.

It may be said without hesitancy that all the advance of the motor car enterprise of China in the past is merely building a foundation for the great future business, and when that time comes, the roads of China will be improved to such an extent, that the Flowery Kingdom (now the Flowery Republic), will offer unlimited pleasure to the world s motorists. It is acknowledged that at present, the combined lengths of the roads fit for motoring, would not total the length of one comparatively short motor run at home, but this is attributable to the fact that only in the open ports where the foreigner resides has it seemed necessary to plan for decent thoroughfares. The Chinese population as a whole are contented with their small footpaths stretching in all directions across the fields, but when the wealthy Chinese feel their ambitions properly stirred the future, as the past, will prove what wonders may be wrought in this strange land. How simple it all will be when the time is ripe—almost unlimited expanses of flat country where motor roads would be among the most interesting that the world could offer, coupled with the fact that Chinese labor is so cheap that the building of good roads will cost less than in any other part of the world. If it were possible to employ Chinese labor in America, or in Europe, long enough to build the desired road, at the same time paying the Chinaman the mere pittance of a wage he receives in his home land, it would not be long before the world's motor roads would undergo such a revolution that they could not be compared with the present. So it is that China will some day take advantage of these opportunities, and build model roads for the world.

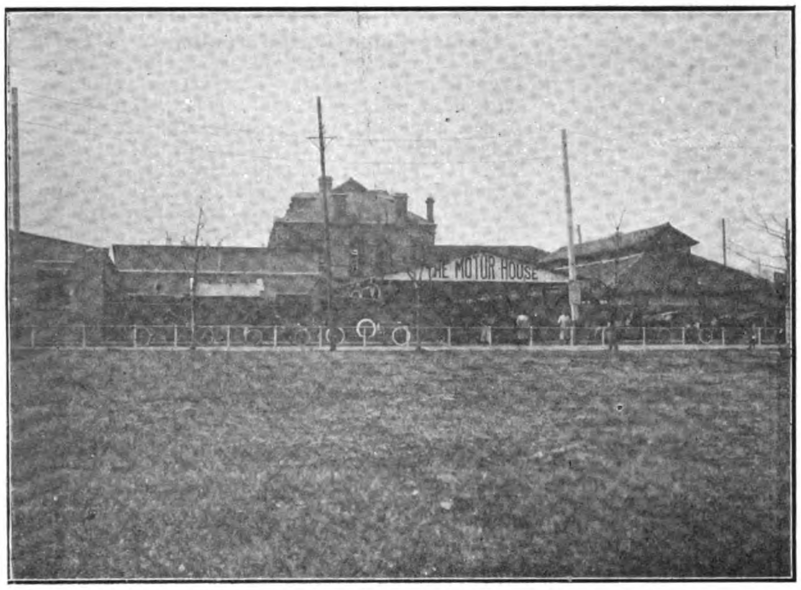
When that time comes, the most interesting of all motor drivers will be available. A trip from Shanghai to Peking for instance would embody mountains, deserts, quaint country villages, pagodas and temples galore, and more than a glance at life in the interior, which could never be gained in any other way. There will, however, always be the disadvantage to the motorists in China of the persistency of the

population to ramble all over the thoroughfare. The wider the road the greater the distance the lower class Chinese travels, first on one side of the road, then on the other, dreamily thinking of his ancestors, and never giving a thought to what may be coming up behind him on the road. In this he cannot be blamed, he has never had to fear anything swifter than a wheel-barrow, and after the wheel-barrow coolie shouts to him, he still has several seconds to remove himself a few feet to the right or to the left as his fancy directs. There have never been any road rules in China, and a walk down a crowded street behind a native, will explain forcibly enough, that the man in front, is merely moved by intuition.

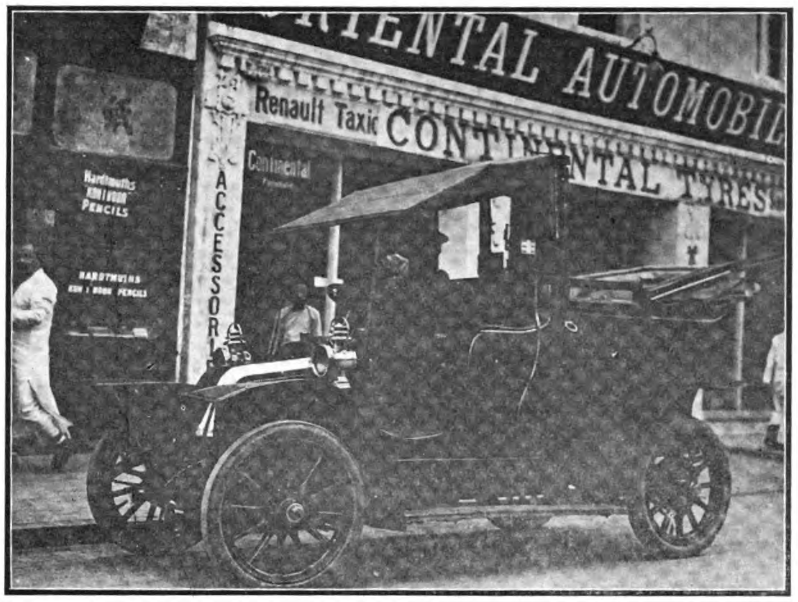
To the foreigner who comes from London or Paris, or New York, or perhaps a small village of America or Europe, this state of affairs is particularly amusing, as well as sometimes aggravating. We have been taught from childhood that if we do not step lively with our eyes wide open when on a public street, we are apt to suffer the penalty, by a hurried ride to the nearest hospital. So it does not behove us to criticise the present generation of city Chinese. They fall comparatively quickly into the ways of the Westerner, and when China awakens in need of good roads, the thousand and one other things that supersede such a movement, will be met and overcome. There will be roads favorably. A little discussion with him regarding the engine and working parts of his car, discloses the fact that he is much better posted in these regards than the average motor owner at home. On the other hand, the Chinese chauffeurs, who are as necessary an adjunct to a car in China as a steering wheel, usually have not the slightest idea of why they push on this lever or pull on that one, except that they were taught to do so. If a car is unfortunate enough to stall in the country, and after the Chinese driver has taken out the spark plugs and cleaned them, persists in refusing to budge an expression of utter hopelessness comes over his face. But the saving grace is that, being of a mechanical turn of mind, the average Chinese who decides to adopt the driving of a car, can be taught just as much as his European prototype.

In Tientsin and Peking the automobile is likely to have a big future. The business there is in its inception, and, as an American Consular report says: Up to a year ago there were only about a dozen motor cars in North China. These were owned in Peking and Tientsin, they being the only cities which have improved roads on which cars are available. A little over a year ago a Tientsin importing firm was induced to take an agency for an American motor car. It brought out three touring cars as a trial order. These became popular, and to date the firm has disposed of extending them to various parts of the country. A writer in the "Japan Advertiser," commenting on the progress of the automobile business, says, "It seems remarkable that the introducers of the motor car in Japan have thus far escaped serious demonstration against the appearance of this modern equipment for speed and utility, even in the interior points of Japan. There are occasional stories of discomforts experienced by tourists to the interior who have been blocked by hundreds of curious Japanese who declined to grant an easement through their village until they had carefully inspected the "devil wagon," but such experiences occur everywhere.

As a matter of fact the introduction the motor has been surrounded by circumstances that have been most favourable. True, the dealers complain that the Japanese who are gradually taking up the subject, are slow to act and purchase, and prefer to dally long with the transaction than to close it at once. This, however, when viewed with that lack of impatience which is developed in dealers in any commodities by years of experience, has been no serious drawback. And it may be called to mind that within the past six months the field in Japan has been developing fully as rapidly, if not more so, than in any of the other countries, saving France, at the start, although it is pointed out that Japan has the benefit of the development of the manufacture



A SHANGHAI REPAIR SHOP



A SHANGHAI TAXI

and good roads in China one day, and the cars which will be seen running upon them, will be picked from the world's markets as meeting the particular needs of the country. From what nation these cars will come will be decided by the advance made in the meantime by the various countries now manufacturing motor cars. There is no man on the face of the earth, who knows a good thing when he sees it better than John Chinaman, and there is no one who can make a better bargain, so the decision come to by the natives in this regard should be one of great interest to the many nations of the world who are now clamouring at the doors of the Orient for admittance. The Chinaman wants the very best he can buy at the most reasonable figure, and what nation will be the favorite one, time alone can tell.

China, which has always been many centuries behind the Western nations, often proves herself many centuries in the lead in many respects. When a country can change its form of government, from the despotic rule of a Manchu to a Republic, within a few short months, it bespeaks the wonders that may be wrought in this country. There is no room for pessimism in regard to China's future in the automobile business. A talk with a native motor car owner usually impresses one very

16 American cars. This firm also established a garage and repair shop. Seeing its success, a British firm has just established a garage and repair shop, and has taken an agency for a foreign car. There is no garage nor repair shop in Peking. There would be an enormous market for motor cars in North China as in other parts if the country possessed suitable roads. The roads all through North China are simply cart tracts winding over the country, and have no modern improvements. The streets of the native cities, except Tientsin and Peking, are too narrow to use cars. The streets are from 8 to 12 feet wide, without side walks and without macadam or paving. In the foreign concessions of Tientsin and in the newer portion of the native city there are wide, well-macadamized streets, about 50 miles in all. In Peking there is about the same mileage of streets available for motor traffic, including a road to the Summer Palace, 18 miles from the city, and with the advent of a new government under modern educated men the existing roads are certain to be soon extended.

As in China so in Japan. The car has come to stay, though its radius of action is at present much greater in the Land of the Rising Sun, for there the Government long ago discovered the necessity for good roads, and is gradually

of cars, while other countries took it up when the car itself was a crude proposition."

Though Hongkong automobile roads are few owing to the formation of the island there are several cars running in the colony, and with the development of roadways on the mainland, the fever for speedy pleasure is certain to spread.

The Straits Settlements Government has provided magnificent roadways to pierce the entrancing scenery which nature has contributed in the Malay States, and all makes and sizes of cars are in use on them. In addition to the hundreds of private cars in Singapore and throughout the States many auto-buses are running and doing good business. In this connection it may be mentioned that the Straits Motor-bus Co., Ltd., Penang, was able to show a credit balance of $12,442, as a result of its operations for the year just closed. A final dividend of 10 per cent. was declared, making 40 per cent. for the year, carrying forward $2,042. The company has now seven 25-seater buses running between Butterworth and Prematang, and between Bukit Mertajam and Kulim.

In Siam also the motor trade has made immense strides and Bangkok can boast, probably, of more cars than any other city in the Far East.

COMPANY REPORTS

Capitalisation of Japanese Companies.—According to an investigation of the Japan Industrial Bank, the capital invested in various enterprises by different companies during the month of June aggregated 71,998,000 *yen*, of which 59,420,000 *yen* was for new establishments and 12,578,000 *yen* for expansion of existing concerns, thereby bringing the total since January up to 416,604,000 *yen* as detailed in the following table:—

	New Establishment. Thou. Yen.	Expansion. Thou. Yen.	Total. Thou. Yen.
Industry	30,505	6,860	37,365
Gas	800	1,650	2,450
Electricity ..	2,120	700	2,820
Commerce ..	16,830	143	16,973
Banking	2,800	3,225	6,025
Railway	4,115	—	4,115
Mining......	150	—	150
Agriculture..	2,100	—	2,100
Total..	59,420	12,578	71,998

New Engineering Company.—A new Company with a capital of ten million *yen*, is proposed in Japan with the object of providing public hygienic arrangements and the sale and production of all such apparatus as may be required for the improvement and development of fire extinguishing systems in the urban districts and irrigation in the agricultural regions. The company will also undertake various public engineering enterprises, or the necessary investigations for such, in connexion with the construction, repair and improvement of waterworks, drainage, irrigation works, besides sprinkling the streets, boring wells, laying waterpipes for bathrooms and toilet rooms, etc.

Dividends.—The Hongkong Rope Manufacturing Co., Ltd., announce an interim dividend of one dollar per share.

The General Managers of the Hongkong Ice Co., Ltd. declared an interim dividend for the past half-year of two dollars per share.

The United Asbestos Oriental Agency, Ltd., pay a dividend of 15% on ordinary shares, a further dividend of 5% and $19.80 per share on 100 Founders shares.

Shanghai Cotton Dividend.—The Shanghai Cotton Manufacturing Co. for the year ended June 30, had a credit to profit and Loss account totalling Taels 392,465.15, which is equal to 39.25 per cent on the paid up capital. A dividend of Taels 6 per share was declared, absorbing Taels 120,000 and a bonus of Taels 2 per share absorbing Taels 40,000. The total dividend equals 16 per cent. The report states that Tls. 65,803.55, additional cost of repairs and renewals for the year, has been charged to Working Account. Land, buildings, machinery, and plant are valued at Tls. 1,189,314.30, and stocks of cloth, yarn, cotton, and waste stand at Tls. 868,559.33. The Agents' Commission for the year worked out at Tls. 40,154.18, and the amount transferred from working account to the credit of Profit and Loss totalled Tls. 430,867.11.

Naigai Cotton Trading Co.—The Naigai Wata Kabushiki Kaisha (Home and Foreign Cotton Trading Co., Ltd.), earned a net profit of Yen 244,342.75 for the half year ended 30th June, from which a dividend at the rate of 15 p.c. per annum and a bonus of Yen 36,600, were paid, Yen 50,000 carried to reserve, and Yen 90,583 carried forward to next term. The subscribed capital of the company is Yen 2,500,000 and reserve funds amount to Yen 1,474,800. The total resources amount to Yen 6,815,017. The company has three factories, two of which are cotton spinning and weaving mills in Osaka and Nishinomiya, and the third a cotton spinning mill in Shanghai. Another mill is in course of construction at Shanghai.

Manchurian Flour Mill Co.—The Manchurian Flour Mill Co., Ltd., more popularly known as the Tiehling Flour Mill, because of its principal plant being located at Tiehling, distributed its net profit as follows: Legal Reserve Yen 2,000; Special Reserve Y 3,000; Consolidation Fund and Deprecation Reserve Y 10,000; Bonus to officers Y 3,000; Dividend to shareholders (at the rate of 10% per annum) Y 12,000; Carried forward to the next term Y 9,437.

Hongkong-Canton Steamboat Co.—The directors of the Hongkong, Canton and Macao steamboat Co. reported at the last meeting of shareholders that after paying running expenses, salaries, premia of insurance, repairs and all other charges there remains, including $22,031.44 brought forward from last account, the sum of $149,820.03 at credit of profit and loss account. From this amount the directors recommended and it was agreed that a dividend for the half-year of one dollar per share or $80,000 be paid to shareholders, $25,000 be written off book value of steamers, $10,000 be written off wharves, properties and lighters, $10,000 be transferred to special repairs fund, leaving a balance of $24,820.03 to be carried forward to new account.

Star Ferry Co., Hongkong.—At an extraordinary general meeting of shareholders in the Star Ferry Co., of Hongkong it was decided to increase the capital from $200,000 (Mex.) to $300,000 (Mex.) by the creation of 10,000 new shares of $10 each. It was also decided that when the reserve fund exceeds $100,000 portion be distributed as a bonus. The sum of $100,000 appearing as a reserve fund is to appear in future as capital, that amount having been expended on a new pier on the Hongkong side of the harbour.

The Indo-China Steam Navigation Co.—The report of the Indo-China Steam Navigation Company for 1911 states that the volume of business during the period under review was, up to the time of the outbreak of the revolution in China, the most satisfactory for several years, and that a corresponding improvement in earnings for the year would have been practically assured had normal conditions continued. The revolution, which affected all China carriers alike brought commerce almost to a standstill, and further, the company in particular suffered the additional disturbance of Japanese intrusion on the Calcutta run. The credit side of the revenue account (including £5,683 brought forward and a transfer of £10,000 from underwriting account) amounts to £99,095, and after allowing £53,639 for depreciation, writing off £1,500 from expenses of debenture issue, and providing for all outgoings, there remains £22,407. It is proposed to pay the dividend on the 6 per cent. Cumulative Preferred for the year 1910, and to carry forward £7,531. The Company has acquired a one-third interest in the steamers *Luen Yi* and *Luen Ho*, previously run by French competitors on the Yangtsze. The remaining two-thirds are owned by the company's allies in that trade, the China Navigation Company and the China Merchants' Steam Navigation Company. Out of the profits of 1910 (including a transfer of £20,000 from underwriting account) the preferred ordinary dividend for two years was paid, leaving one year in arrear.

Japan Cotton Mills Output.—The returns of the output of the cotton spinning mills of Japan during July show that 107,193 bales of cotton yarn were produced, an increase of 18,653 bales as compared with the corresponding period last year, but a decrease of 7,426 bales or 7% as compared with June. The cause of the decrease in July in comparison with June seems to be that the labor world was largely affected by the hot weather and that all the mills were closed for one day owing to the death of the Emperor. Another reason was that the mill owners have found no necessity to increase production, because export and home consumption have recently decreased to a large extent so that there remains a great stock of goods waiting to be cleared.

Shanghai Cotton Manufacturing Co.—Last financial year's operations resulted in a net profit of Tls. 392,465.15, which was dealt with as follows:—

To write off buildings Tls. 7,755.10; To write off machinery and plant Tls. 35,865.51; To write off weaving plant Tls. 13,598.19; To write off silk filature Tls. 10,000.00; To write off furniture Tls. 405.00; To pay a dividend of Tls. 6 per share Tls. 120,000.00; To pay a Bonus of Tls. 2 per share Tls. 40,000.00; To set aside as reserve for equalization of dividend Tls. 150,000.00; To carry to new account Tls. 14,841.35. Total 392,465.15.

The Chairman explained that the 1911-1912 China cotton crop was very unsatisfactory both in quality and in quantity, but the bumper yield of American cotton enabled the Co. to make up the shrinkage by the importation of foreign cotton which could be secured at a very reasonable price in consequence of the favourable rate of exchange.

To the revolution which made itself evident so unexpectedly in October last, can be attributed that financial stringency from which a few of the dealers suffered, with the result that a certain quantity of yarn was thrown upon the Co.'s hands, but fortunately the loss sustained thereon was not serious.

Insular Construction Company.—Messrs. J. E. Ainsworth and O. F. Campbell have organized the Insular Construction Company with head office in Manila. The capital stock of the corporation is P550,000, P415,000 being fully paid in. Mr. J. E. Ainsworth, is president, Mr. H. Thurder, vice-president, and O. F. Campbell is treasurer, while Mr. W. P. Poland and Mr. E. B. Bruce are the incorporators and directors. This construction company will engage in work throughout the Philippine islands.

TELEGRAPHS, TELEPHONES AND WIRELESS

Dalny Telephone Service.—The work of transferring the telephone lines from overhead to underground in the city of Dalny has been completed in the principal streets.

Telephones at Tsinanfu.—Messrs. Arnold Karberg and Company have signed a contract for the installation of telephones in Tsinan-fu. The magneto system and American plant will be used for the service, which will extend throughout the city.

Japan's Telephones.—A special committee has been appointed by the Japanese Communications Department to make investigations concerning the programme of telephone expansion, the accelerated installation to be adopted in important cities, and the control and running of the telephone service. The project is said to be mainly based in the scheme formulated last year which was rejected from financial considerations; that is, the undertaking to be spread over a period of six consecutive years at a cost of 50,000,000 *yen*.

Wireless at Zamboanga.—The work on the construction of a new concrete wireless station at Calarian, Zamboanga, has been commenced. Six sets of quarters for the operators and other employees of the station are also being constructed.

When the Philippine wireless bill is passed by Congress there will be constructed at Zamboanga a high power station which will be able to connect with all other stations in south Philippines, and, it is hoped, with Manila. This station will be located in the city, on the lot behind the present custom house.

Anticipating the passage of the bill, the Bureau of Posts is now constructing new wireless stations at Puerto Princesa and Cuyo.

ELECTRIC LIGHT AND POWER PLANTS

Electricity Company in South Manchuria.—A private electricity company has been formed with a view to establishing plants at Kaiyuan and Kungchuling, by Mr. T. Saiga, proprietor of the Saiga Electricity Co., Osaka, and others. This company is to be capitalized at Y350,000 divided into 7,000 shares of Y50 each. Messrs. Gonta and Kondo of Tiehling, Messrs. Noya and Kuraoka of Kaiyuan, and Messrs. Miwa and Uyeno, of Kungchuling, are expected to join the promoters. At each plant two generators, each of 75 kilowatts, are to be installed, and to be equipped with a third spare generator. Gas will be used for motor power. The S.M.R. Co. has undertaken to purchase all the necessary machinery, etc.

Hydro-Electric-Plant.—An important Japanese contract has been obtained by Messrs. Dick, Kerr & Co., Ltd., of London and Preston. They have obtained from a Japanese hydro-electric power company what is described as probably the largest order for water-driven alternators which has been placed in Great Britain. The order covers six alternators, each of 7,775 K.V.A. capacity, representing over 60,000 h.p.

Lighting Ipoh.—The Perak Chamber of Commerce have asked the Government to light Ipoh (Federated Malay States) with electricity.

Tsinanfu Electric Light.—The Electric Light Company at Tsinanfu, China, is so short of funds that it is unable to extend its service to many parts of the city, where is has already erected poles and wishes to deliver light. So far as it has inaugurated its service it seems to be very satisfactory. A number of places in the Settlement are using its light, including the German Consulate and the German Bank.

Electric Light at Batangas.—Bevan Montague's electric lighting plant at Batangas. Philippine Islands, has been opened, Mr. Montague has been operating, for some time past, an ice plant, a distilled water plant, and a small electric light plant. The latter furnishing the current for a local cinematograph, also providing the lighting for numerous concrete buildings, including the Batangas opera house. This theater is well fitted, handsomely decorated and possesses a modern stage. Several opera companies from Manila have performed at the Batangas opera house which has a seating capacity of about 2000. The center of interest was the large "Otto" Diesel engine, the first of this kind installed in the islands. The engine is belted to a dynamo which generates sufficient electricity to light up the whole town of Batangas, and to furnish electric light to the buildings of the city.

Lucena Electric Plant Contract.—The contract for the construction of an electric light and ice plant for Lucena, Tayabas, P. I., has been awarded by the Lucena Electric Light, Ice and Water Co., to Messrs. E. C. McCullough and Company. The contract price for the construction is P60,000, the plant to be built upon latest improved methods, the first to be used in the Philippines in that class of construction. Besides furnishing electric lights and ice for the city, the Lucena company will supply the municipality with distilled water. The plant will use crude oil instead of coal, and Crocker & Wheeler generators will be installed. The construction of the electric light plant will begin at an early date, concrete poles will be used, the cross arms will be of steel, as well as the pins, this being a new invention that will be used for the first time in the Philippine Islands. The line will include approximately forty miles of wire to be strung throughout the town of Lucena, and one hundred Philips lamps, of sixty watt power, will be installed to light the streets. The company has contracts for three thousand incandescent lights to be installed in private houses and government buildings, which will be increased from time to time, and extended should occasion warrant.

Yingkou Hydro-Electricity Co.—The business returns of the Yingkou (Manchuria) Hydro-Electricity Co., at the end of last month show that the Company sold water to the amount of 280,000 gallons, supplied light to 9,000 lamps, and had 535 subscribers to the telephone service, at compared with 200,000 gallons of water 6,000 lamps, and 448 subscribers at the end of October last year.

INDUSTRIAL PLANTS

Sugar Factory for Formosa.—A plan is on foot to establish a sugar manufacturing company in Formosa, with a capital of five million *yen*, the promoters being Messrs. Nade, Takashima and other prominent business men. It is said that the new Company will purchase the Noda Sugar Factory at Pinan in Taito province, and the Shingo Sugar Factory at Riryosha in the same province, and instal pressing machines of 500 tons in the Pinan factory and of 700 tons in the Riryosha factory. Business is to be opened from 1914. The area of the sugar cane plantation covers 1,044 *kobu* at Pinan and 410 *kobu* at Riryosha, and in 1916 the Company will be able to instal, according to the promoters, another machine of from 750 to 1,000 tons. The Company will be named the Taito Seito Kaisha.

East Asia Tobacco Co.—It is reported that the East Asia Tobacco Co. has selected a site at Shaokangtzu (Chinese Quarter of Dalny) for the construction of a branch factory of its Yingkou plant, and proposes to commence work shortly.

Glass Factory for Dalny.—The Governor General's office in Kwantung contemplates establishing a glass-factory in Dalny for the purpose of meeting the growing demand in Manchuria and North China for glass of various descriptions, such as lamp chimneys, bottles, etc. In starting this undertaking the Kwantung authorities propose to ask business men in Japan Proper to take charge of the new concern, granting them an annual subsidy. It is stated that if the undertaking is successful the authorities, with the help of leading industrial men, propose to establish a large glass-factory in Manchuria.

New Yokohama Enterprise.—The Yokohama Cotton and Hemp Spinning Company organized a short time ago by Messrs. Abe, Tanaka and Tsubai, as promoters, will be the newest of Yokohama industries to get under way at Minami Ota, Yokohama. The installation of machinery has been completed.

Soap Manufacture.—The new works of Messrs. Lever Brothers, near Amagasaki, Japan, are almost completed, and it is believed that in a short time the products of this company, made in Japan, will be on the market.

Tiehling Flour Mill.—The Tiehling Flour Mill Co. has decided to call up Y5 per share for the construction and equipment of the branch factory at Changchun. The laying of foundation for the new factory has already been completed.

Art Glass Plant.—Rosenberg's Inc. have added an art glass works to their business at Manila where they manufacture cathedral and memorial lead glass windows, art glass domes, and the like. They have also added one of the largest and most up-to-date electroplating plants in the Philippines.

The Gas Works at Dalny have now under installation a new tank capable of holding 350,000 cub. metres. The consumption of gas in Dairen has risen to about 170-180,000 cubic metres per day. The present tank only hold 150,000 cubic metres.

Antung Gas Co., Ltd.—The Antung Gas Co. is about to be organized by a group of promoters including Messrs. Hisayama, Ishihara, and Misaki of Antung, and Messrs. H. Okura, Yamada, Chiba, Nishio, &c., of Tokyo, who hold the consent of the S. M. R. Co. to this new enterprise, and also the concession to serve gas to the Chinese quarter. The company's capital amounts to Y300,000, of which one quarter is to be paid in as the first instalment. The promoters hope to finish the foundation work of the new plant before the end of this year.

Reservoir at Dalny.—It is proposed to build a reservoir behind Osakamachi, Dalny, for street watering purposes, for which 650 tons per day are required. The cost of the reservoir is estimated at Y35,000.

SHIPPING AND SHIP BUILDING

Chinese Government Shipping Co.—According to the Canton correspondent of the *China Press* (Shanghai) the Republic will later on own a shipping company of its own. Chang Ji Yung, principal stockholder of the China-Siam S.S. Company is said to have contributed to the Kwangtung Government 70,000 shares of capital stock at about nine dollars each, which that Government will accept and will in turn transfer to the Central Government.

The steamship line at present is valued at about $2,700,000, it is stated. According to Mr. Yung Hoi, Acting Commissioner of Communications at Kwangtung, if the government finds it profitable, the capital will be increased to ten million dollars. Mr. Yung hopes that he will be able to procure a subsidy from the government for the service of carrying mails. If the government is able to control the company by reason of being a majority holder in the company, it is believed it will eventually own it by taking up the other interests and making it a part of the navy.

The North China Steamship Co. of Dalny, has entered into a contract for the purchase of the French steamer *Gius Thun* at Y130,000. The steamer has hitherto been working the Saigon-Hongkong route under the Annam Government subsidy. She was built in 1902, and has a gross tonnage of 1,726 tons. She will be used as an auxiliary ship to the Company's steamers *Tencho Maru* and *Saitsu Maru*.

Steam Trawler Held up.—The trawler *Hoi Fung*, belonging to Hongkong and South China Steam Fisheries Co., Ltd., has been laid up in Shanghai on account of opposition by the Republican Government to foreigners engaging in the fishing industry. The question is considered to be one affecting the Chinese Government's fishing rights in her sovereignty as an independent power.

Japanese Steamship Purchases.—The str. Asia of the Russian East Asiatic Fleet has been purchased by Messrs. Iwaki, of Chefoo. The Asia, formerly the Tabor, is of 2,416 tons gross was built in 1890 at Glasgow, with dimensions, 320 X 39 X 20 ft. The vessel will, it is understood, trade on the Gulf of Pechili.

It is stated that the Kishimoto Steamship Co., Kobe, who have recently purchased the Danish str. Siam, and other local companies will shortly be in the market for more second-hand tonnage amounting in all to 70,000 tons.

The Mitsui Bussan Kaisha have recently purchased the British str. Indravelli at Yokohama. The purchase price is stated to be £28,000 sterling. Built in 1897 at Glasgow, the Indravelli is a steel steamer of 4,828 tons gross.

Launch for Borneo.—The steam launch Marlow, which at one time belonged to the Canton-Kowloon Railway, has recently been sold to Messrs. Jardine, Matheson & Co., Ld., for $13,000. She has had a thorough refit, and is now boarded up and prepared for the long journey to Borneo, which is her ultimate destination. She is to do the voyage under her own steam.

Passenger Motor Boat.—Messrs. J. W. Kew and Co., of Hongkong, have just built a powerful motor boat for the Kwong Sai Navigation Company for their West River service. The new vessel, which will run between Wuchow and Nanning, has the following dimensions: L. O. A. 81 feet, beam 16 feet, draught 3 feet. Accommodation is provided for 150 passengers on a roomy covered deck fitted with bunks; loaded with 25 tons dead weight and with her full complement of passengers and crew, the boat draws only three feet. The motor installation is a six-cylinder set developing 110 B. H. P., and embodying all the latest improvements. It is fitted with magneto ignition, and a self starting device. There are now eight boats on the Wuchang-Nanning run so equipped; the utility of the motor boat for this form of service appears to have been fully established.

The Philippine Yacht.—The chief quartermaster of the Philippine division has awarded to the Hongkong and Whampoa Dock Company the contract for repairs to the *Aguila*, private yacht of the commanding general of the Philippines division. According to the specifications of the dock company the *Aguila* will spend the greater part of five months at the dockyards undergoing repairs for which the contract calls. She is to have a new sun deck and deckhouse, new steering apparatus throughout, and a number of other repairs and additions which will put her in first class condition. The longest time will be required in the installation of a patent hydraulic telemotor.

Revenue Cutter.—The governor-general of the Philippine Islands has agreed to the expenditure of P200,000 to build and equip a cutter to put down piracy in the Sulu Archipelago. The design for the vessel has been prepared in Manila under the direction of Acting Collector of Customs J. S. Stanley, who will direct the movements of the ship when completed. The cutter's gross tonnage will be 250 tons and her length over all 140 feet.

Her speed will exceed 16 knots an hour. Her armament will be two Hotchkiss rapid fire guns which will be mounted on the port and starboard sides of the commander's bridge. Besides these in each of the two fast motor boats to be carried in the davits amidships there will be an automatic Colt rapid fire gun mounted on a tripod. The motor boats will be capable of developing an even greater speed than the Cutter and they are to be used in pursuing the sapits when the smugglers endeavor to play their old trick of dodging the revenue officers by sailing close to shore over the huge reefs which make navigation in the Sulu Archipelago a fine art.

Lighter for Bangkok.—The N. D. L. steamer Rajaburi left Hongkong recently towing the second of a number of lighters for Bangkok. The lighter was built by the Hongkong and Whampoa Dock Co. and is a strongly constructed steel vessel specially built for carrying heavy weights. It has on board a donkey boiler and two powerful winches capable of lifting 15 tons and 5 tons respectively, and will be employed carrying railway material for the new line that is being constructed in that neighbourhood.

The China Navigation Company's cold-storage steamers "Taiyuan," and "Changsha," on the run between Australian ports and Honkong, via Zamboanga and Manila, has been purchased by the Philippine Cold Storage Co.

Manila Dredgers.—An allotment has been made by Acting Secretary Branagan, of P90,000 to the port works division of the Philippine Bureau of Navigation which will be used in constructing new steel hulls for dredges Nos. 3 and 7, which have been laid up for a long time because of the unsafe condition of their bottoms. Work will be undertaken immediately by the Bureau of Navigation to place the two dredges in commission, and they will be added to the fleet now at work as soon as repairs to them are completed. These two additional dredges will enable the Bureau to make more rapid progress toward placing all the navigable esteros in first class condition, the fleet now available not being sufficient to handle all the work required of it.

BUILDING

Boom at Dalny.—The building boom at Dalny is commented upon by Mr. K. Inouye, Manager of the Yokohama Specie Bank, at Dalny. He says that the boom is due to the enforcement of building regulations, which expressly provide for the cancellation of the existing lease of lands unless building work be started within a specified period. Taken as a whole about 20% of the buildings of Dalny are untenanted. It is said that the total investments put into new buildings since the beginning of this year amounts to *yen* 1,300,000. Mr. Inouye says: "The excess of supply of buildings to let is bound to have the effect of causing a sort of anemia in the economic organism of Dalny, which will bring a business depression in its train. On the other hand, the house-owners themselves will not be able to find always desirable tenants for their buildings,"

The new buildings for which permits were applied to the Dalny Civil Administration from the beginning of this year to June 23rd last numbered 188 for Dalny, 119 for Shaokangtzu (Chinese Quarter), and 5 for the suburbs, making the total of 313.

Bureau of Supply Warehouses.—To provide proper support for the Bureau of Supply Warehouses at Manila 9,000 piles are to be driven at a cost of P200,000. This will entail a delay in the completion of the Bureau of Supply building of about two years. Careful test of the piling has been made by the use of an electric driven pile-driver, which power will be utilized in carrying out this particular work.

New Provincial Capital.—As San Isidro will be abandoned as the provincial capital of Nueva Ecija, Philippine Islands, and the seat of the provincial government will be moved to Cabanatuan, which is more centrally located, the Governor-General has authorized a loan of P70,000 from insular funds to the province of Nueva Ecija, for the construction of a provincial capital, jail, school, and other structures required for provincial government purposes. Ten hectares of ground has been set aside in the town as sites for those buildings.

Taal Observatory.—The buildings for the Taal Observatory to cost P10,000, which are being constructed by contractor Murphy, will be completed in September and will be ready for the reception and installation of the apparatus when it arrives.

Some of the instruments are the latest inventions in seismic apparatus, and have never before been used in this part of the world. An observer is now stationed on Taal volcano, but the instruments used there at present are smaller and not as delicate as those to be installed.

One of the greatest difficulties in the erection of the new building has been the condition of the road from Tanauan to the shore of the lake. Father Maso recently made a trip to the volcano, taking some instruments down to the temporary observatory, and states that, instead of a three hour trip, as it should be, it was two days trying journey.

Hospital for Manila.—Over P40,000 out of the P70,000 required for the Spanish Hospital for Manila having been obtained a site has been secured on Calle Sandejas and the foundation stone has been laid by the Acting Governor-General.

The plans call for the erection of one main building and three wings, the ground floor of frame construction. There will also be two detached buildings for the care of infectious and contagious diseases, and the equipment throughout is to be of the most modern kind. The hospital is to be in charge of Dr. Martin and Dr. Diaz Perez, and the governing body is composed as follows: Enrique Brias, president; Trinidad Jurado, Martinez Romero Salas, Carvero Elizaldo Irueta, and Goyena Varguera, directors.

New Warehouses at Pandacan.—A large tract of land has been purchased in Pandacan, Manila, by Messrs. Germann and Company for the sum of P30,000.

This sale is deemed important as indicating a movement to center the export warehouse business in the district bordering the river and accessible by the branch line of the Manila Railroad Company now being constructed to parallel the river. Stevenson and Company have already erected a large concrete warehouse and Germann and Company expect to begin the construction of their building in the near futnre. It is estimated that the cost of building has in this manner been reduced some fifty per cent and another great saving will be the ability to handle cargo independently of the government piers.

A modern apartment house to cost in the neighborhood of P65,000 is to be erected in Ermita between Calle Salsipuedes and Nueva, Manila. Plans have been already submitted to the city engineer. There are to be 12 apartments in the building which is to be four stories high. Concrete floors will be laid.

Plans for the construction of the main tank for the Manila gas company have been approved. The tank is to be 24 meters in height and 30 in diameter. Over 600 piles will be sunk for the foundations. The tank is to have a pressure of 15,000,000 pounds.

HARBOUR WORKS, CANALS, IRRIGATION AND WATER WORKS

Proposed New Port.—Merchants in Hongkong propose opening Chinglang as a commercial port. They propose to start with a capital of $1,000,000, and have secured the consent of the Tutuh of Kwangtung to the scheme.

New Signal Station at Dalny.—The construction work on the Signal Station No. 2 at the northern extremity of East Breakwater, Dalny, has almost been completed. It stands 130 ft. high above the base, being 90 ft. higher than the Signal Station No. 1 at the northern extremity of Main Quay.

Tokyo-Yokohama Canal.—The first calls on the promoters' shares of the Tokyo-Yokohama

Canal Company having been paid up, allotment of the shares is being made. A representative of American capitalists, who came to Japan some time ago to investigate conditions, is said to have expressed himself as satisfied with the future prospects of the proposed canal, and repeatedly signified his willingness to participate in the enterprise. Negotiations are to be opened for the introduction of American capital.

Filters for Shameen.—The Shameen (Canton) Municipal Council is installing filters by the Candy Filter Company. The foundations are now being built.

Improving Zamboanga.—Plans for the improvement of Zamboanga (Mindinao, P. I.) harbor, are being prepared, the estimated cost of the work being P800,000. It is understood that the port plans proposed include the construction of a sea wall and the dredging of a basin deep enough to receive the largest vessel and give it anchorage. The material dredged will be utilized, as in Manila, to construct a port extension which will be developed along the same lines as in the capital city. The reclamation will be devoted to wharves' storage sheds, warehouses, etc., and the wholesale district will ultimatily be located there.

The first-stage of the work, if approved, will be confined to the dredging and mapping out of a reclaimed area. Then will follow the construction of wharves. The main difficulty will be the financing of this project and it is not improbable that only the initial work will be undertaken this year.

Tarlac Irrigation Contract.—The Insular construction company has secured the big Tarlac irrigation project contract.

The amount bid by the winner was close to P496,300 and the work of construction is to commence as soon as the necessary material can be secured from the States. There will be about 12,000 cubic meters of concrete work and 10 miles of piling, 5 miles of the latter being wooden piling, for which lauan, one of the native woods will probably be used, while the other 5 miles will be of steel piles, which will have to come from the States. There will also be about 80,000 kilograms of reinforcing steel used in the job. The larger part of the main ditch is already built and the contract of the Insular construction company is for the 3 kilometers at the upper end and for the head works, the company also putting in the dam, dikes and protective works generally. The main ditch is 12 kilometers in length and there will be 4 or 5 main lateral feeders. The water comes from the O'Donnell river and the whole system, when completed, will irrigate the lands of the Compania General de Tabacos, the said company to pay a stipulated sum per hectare for the use of the water and to have right, at the end of ten years, of purchasing the system from the government at the original cost of construction.

The construction of this huge irrigation project will be in charge of the irrigation division of the bureau of public works, which will have an engineer on the job continuously to watch the government's interests.

Reclamation at Dalny.—The South Manchurian Railway Co. is entering upon a reclamation scheme at Dalny to cost yen 800,000. The land reclaimed will be used for warehouses and storage grounds for goods. A basin 900 feet long by 200 feet wide will be provided for junks, boats, etc.

Water Supply for Siquijor.—Lieutenant-Governor James R. Fugate, of Siquijor island, who has been handling all construction projects on the Island of Siquijor, a subprovince of Oriental Negros, P.I., has practically completed a gravity system for Canoan, Siquijor island. The water of several small springs was collected into one large reservoir and brought into the municipality by means of a 2½-inch pipe line. A circular fountain in the center of the town serves the whole population and eliminates the 2-kilometer walk which was previously necessary to secure potable water.

A second and more important water system has been constructed by Lieutenant-Governor Fugate in the town of Siquijor on the island of the same name. An allotment of P18,000 of Insular funds was secured for the purchase of material only, the municipal officials guaranteeing to receive the material at the ship's side and to do all the work necessary for the installation of the system. The municipality carried out its promise to the letter and constructed a main line of 4-inch and 3-inch pipe for a distance of 4 kilometers from the spring to the town, and also a distribution system which supplies all the population for 4 kilometers east and west of the town. Lieutenant-Governor Fugate has made some excellent original designs for reinforced-concrete fountains, which have drinking troughs for horses and cattle and smaller troughs for the smaller animals, places for washerwomen to work, and a private bath at each fountain. These fountains are located about 1 kilometer apart east and west of the municipality.

Cebu Province Schemes.—The plans for a new project, the construction of waterworks for the municipality of Pilar, Camote Islands, Province of Cebu, P.I., have lately been forwarded by the district engineer. The population to be supplied is about 1,000; the capacity of the spring is about 20 gallons per minute and the per capita supply is 28.8 gallons per twenty-four hours. The distance of the spring from the town in approximately 1,600 meters, with an elevation of 12 meters. The distribution system plan consists of 1-inch and 1½-inch pipes and the estimated cost of the project is P12,480. The municipality has requested a loan from the gold-reserve fund in order to assist in this work.

Another project is the construction of a water-supply system in the municipality of Carcar, Province of Cebu, to supply a population of 5,000. The capacity of the spring is 28 gallons per minute and the distance of the spring from the town is 3,100 meters, with an elevation of 18 meters. The plan calls for a circular reinforced concrete covered storage tank having an inside diameter of 5.6 meters with an elevation of 13,400 gallons from the night run-off of the spring. The main pipe line from the storage tank to the town is made up of 3½-inch pipe capable of delivering 60 gallons per minute into a distribution system composed of 1½-inch and 3-inch pipes. The estimated cost of the completed work is P20,000 and the municipality has requested a loan from the gold-reserve fund to execute this work.

The municipality of Naga, Cebu Province, has requested the district engineer to investigate and prepare plans for a water-supply system. These plans have just been submitted to the Director of Public Works for approval. The population to be supplied is approximately 5,000. Two springs, 1,200 meters apart, have been connected and the discharge is through a 1½-inch pipe line 300 meters long into a circular reinforced concrete covered storage tank of 5 meters inside diameter and 2.8 meters in height, capable of receiving 13,000 gallons during the night. The elevation of these springs is 77 meters above the town. The main pipe line consists of a 2-inch pipe which is 1,430 meters in length; distribution system of 1½-inch pipe. The estimated cost of the system is P9,000 and the municipality has requested a loan from the gold-reserve fund for the execution of the work.

Another project in Cebu Province is the Tudela water-supply system. The municipality of Tudela in Camote Islands is isolated on a small island 30 miles from Cebu, and the success of the San Francisco water system in the same group of islands has encouraged them to request a similar supply. The source of the supply is a spring 1,700 meters from the municipality, with an elevation of 155 meters. The discharge of this spring is 23 gallons per minute. As wrought iron pipe should not be subjected to a pressure of 100 pounds per square inch, it was decided best to construct a small distribution tank near the town, with a sufficient head to give all the necessary pressure for the distribution system of 1½-inch pipe line, without valves so that no heavy pressure would result in the line. The estimated cost of the system is P 4,500 and the municipality has requested a loan from the gold-reserve fund for this project.

The municipality of Sibonga, Province of Cebu, has also requested a loan from the gold-reserve fund for the construction of a gravity water system. The population to be supplied is estimated at 6,000. The spring from which this supply is to be secured is 4,300 meters from the town, at an elevation of 90 meters, and has a flow of approximately 44 gallons per minute. The plans call for a circular reinforced concrete covered storage tank. From the spring a 3-inch pipe will deliver water into Sibonga through a 2½-inch and 1½-inch distribution system. One hydrant will always be kept open in the municipality to cut down the pressure on the main pipe line. The estimated cost of this project is P20,000.

The district engineer of Cebu has also submitted plans for the construction of a water system in the municipality of Argao, Province of Cebu. This system is very similar to the design of the system for Carcar and Sibonga, described above. The main spring is 4,700 meters long and consists of 2½-inch wrought-iron pipe discharging into a 2-inch and 1½-inch distribution system, The storage tank will have a capacity of 9,600 gallons. The estimated cost of this project is P20,000. A loan has been requested by the municipality to execute the work.

The district engineer has also submitted plans for a water system for the municipality of Catmon, Province of Cebu. The spring is located 1,700 meters from the town at an elevation of 42 meters. It has a flow of 25 gallons per minute. A circular reinforced concrete covered storage tank of 15,000 gallons capacity will be located near the spring. The main pipe line will consist of 2½-inch wrought-iron pipe and the distribution line will be a 1½-inch pipe. The population to be supplied is estimated at 1,500, and the estimated cost of the system is P6,650. The municipality has requested a loan from the gold-reserve fund for the construction of this system.

The construction of municipal water-supply systems is doing more than any other one thing toward bringing the municipal authorities and district engineers together in the performance of public works in the various provinces.

Water Works for San Pablo.—Complete preliminary investigations and plans for the installation of a gravity water system for San Pablo, La Laguna, P.I., have been made. The sources of water for the system investigated and approved are springs about 6 kilometers east of San Pablo at the foot of the San Cristobal mountains. The estimated cost for the system complete in P81,000, and it is calculated that it will supply a minimum of 750,000 gallons per day. This supply will afford ample fire protection and sufficient water for all other purposes for many years to come. It has been recommended that a loan be granted the municipality for the partial construction of this water system.

Artesian Well at Wright.—The artesian well division, of the Bureau of Public Works, drilled a well in the town of Wright, Samar, P.I., that was sunk to a depth of one thousand and fifteen feet, and is cased with four and one-half inch diameter steel drive pipe. This is the first time in the history of the Philippine Islands that good water had been obtained in any part of the islands at a depth greater than eight hundred feet. The flow of the well is rather small being only one and one half gallons per minute, but the water rises to a heigth of forty feet above the ground without diminishing the flow, making it possible to erect a tank or reservoir to receive the overflow, none being wasted. Pumping at the rate of ten gallons per minute lowers the water to twenty

feet below the ground level. In drilling this well slate without bearing formation was drilled through to a depth of nine hundred feet, at which point sandstone of a close grain variety was encountered. No water of any kind was found between nine hundred feet and one thousand and fifteen feet, at which point the flow was obtained. The water is of excellent quality, and while the amount produced is small it is sufficient to supply the inhabitants of the town of Wright, Samar, if economy is used. The machinery that was used in drilling this well is now being moved to Sumarraga Island, near Wright, Samar.

RAILWAYS

Moscow-Peking Railway.—The *Koelnische Zeitung* reports from St. Petersburg that Mr. Kokovtzev, the Russian Premier, has examined plans for the construction of the Moscow-Peking Railway and promised to guarantee the interest on the capital needed for its construction.

Two alternative routes are spoken of in connection with this route.

According to the plan, one of them, which may be called the Northern line, would utilize the present Siberian line as far as Tcheroniginsk or Irkutsk, and also a part of the Baikal line runs to Kiakta, whence it will proceed to Peking, via Changchiakow, passing through Mongolia. The line is the shorter of the two, the total length being about 1,200 (Russian) miles. The construction of a railway connecting Changchiakow with Kiakta was projected and suggested to the Russian Government by General Torunisin two years ago, but the suggestion was not accepted by the Government.

The other line, or the Southern line, provides for an entirely new construction. Starting from Moscow the line will reach Semipalachensk, viâ Suizuran, Samala, and Orenburg, and running Northward from Semipalachensk, taking a course parallel with North Latitude 50, will reach Kiakta traversing through the Mongolian plain, then going to Peking viâ Changchiakow. The construction of the line involves great difficulties and immense expense, it being necessary to develop a new route in the waste land and the Gobi desert. It is also necessary to construct a new trunk line between Moscow and Semipalachensk utilizing a portion of the Orenburg-Tashkend Railway. That line alone extends for about 2,500 (Russian) miles, about one-third of the entire mileage between Moscow and Peking. In addition the line between Semipalachensk and Kiakta covers 3,000 (Russian) miles and that between Kiakta and Changchiaknow 1,200 (Russian) miles.

These two lines were at first strongly opposed by the Russian Government, but in consideration of the report that the land survey of the projected railway has been already started, it is probable that an understanding has been concluded between the Russian Government and the American-German syndicate, perhaps adopting the Northern line.

It is also reported that the Chinese Minister in St. Petersburg has had some connection with the project from the beginning.

Effect of the Yunnan Line.—A correspondent at Yunnan writes as follows: The advent of the French railway giving the people of Yunnan direct access to the sea at its nearest point, and the constant contact and unremitting pressure that the railroad supplies as between an enterprising people on the one hand and a phlegmatic unwilling population on the other, one can easily see how the whole situation has been modified and complicated by the coming of the iron road. This province promises to become a bone of contention both politically and commercially—just now French, British, German and to some extent American firms are competing for and urging on the Chinese the rival merits of their respective houses for the supply of equipment for projected railroads, mines, etc., and needless to say it places the Chinese in a very embarrasing position. There are rumors of a small French loan having been made to ease the financial pressure at one point, but it is so small as to be of little use to any scheme of development. Just at present the railroad is suffering from its usual summer complaint; the mountains have commenced their annual campaign against the road and traffic is much interrupted. The cost of maintenance is a formidable item in the operation of the railway, especially as most of the hills are quite bare of trees and most of our year's rain falls in a brief space during the summer. The erosion is very great and tends to demoralise the railway schedule for the summer months.

South Manchuria Railway.—The South Manchuria Railway Co's. gross receipts for the half year ended March 31, amounted to Y 16,701,912.867, which, when compared with the receipts of the corresponding term during the previous year, shows an increase of Y 1,335,469.014. The total amount paid out by the Company was Y 13,290,373.391, which is also an increase of Y 999,253.538 over the disbursements made during the same term of the year before. From this, it will be seen that the Company's net profit amounts to Y3,411,319.475, an increase of Y 336,215.435 over the gains acquired during the corresponding six months a year ago. Below is given a statement of profit and loss of the Company for the present term.

RECEIPTS.

Railways	Y. 11,202,163.
Ships	217,068.
Mining	3,492,756.
Harbor	716,581.
Local	230,102.
Hotels	112,102.
Electricity	409,400.
Gas	81,764.
Miscellaneous Profits	62,175.
Interest	1,778,787.
Total	16,701,912.

DISBURSEMENTS.

Railways	Y. 3,585,051.
Ships	261,420.
Mining	2,265,356.
Harbor	619,140.
Local	564,327.
Hotels	140,268.
Electricity	321,734.
Gas	46,739.
Miscellaneous expenses	1,610,461.
General expenses	923,385.
Interest	2,724,555.
Difference on the face value of debentures and the actual amount received	170,023.
Total	13,290,373.

Electricity on the Karuizawa Line.—The electric generating stations and other necessary buildings, which have been in course of construction by the Eastern Lines Superintendence Office of the Imperial Railway Bureau, with a view to running trains equipped with electric locomotives over Ushi pass, on the Shinetsu line, have been completed.

S.M.R. Traffic Returns.—The South Manchuria Railway Traffic Returns for the month of July give the daily average of Y 35,217, being an increase by Y 8,569 over the corresponding period of last year.

New S.M.R. Box Cars.—Sixteen box cars, completed at the Shahokou Railway Workshops at the end of last month, passed a trial operation, and will be brought into service for the transportation of Beans on the advent of the new Bean Season.

S.M.R. Locomotives.—Two railway locomotives were completed at the Railway Workshops at Shahokou on August 3. They passed a trial run to which they were subjected later. This has raised the total number of the Company's locomotives to 256.

Canton Hankow Line.—The Civil Governor at Wuchang has held a conference with the leading members of the Hupeh Government at which it was decided to instruct the Hupeh Government Bank and the Railway Bureau to give a detailed report of the funds collected from the merchants and rich families as shares for the construction of the Canton-Hankow Railway and the Szechuan-Hankow Railway. They will be also asked to give a report of the lands bought for the line of the railway. A list of all the members of the old staff of the Railway office will be delivered to the New Railway Office so that they may be examined and employed if suitable.

The Canton correspondent of the "Hongkong Telegraph" writes that Mr. Tam Yun Fung, Director-in-Chief of the Canton-Hankow Railway, intends to divide the whole length of the line into three sections, on which work will be commenced simultaneously. The first section will be from Wuchang to Ngokchow; the second section from Ngokchow to Wingchow; and the third section from Wingchow to Canton. Mr. Ching Ming-chiu will be appointed manager of the first section; Mr. Chau Yau-loong, manager of the second; and Mr. Jim Tin-yau, manager of the third section, in addition to his duties as Deputy Director-in-chief of the Railway, which latter appointment has just been announced.

Mukden-Itungchou Railway.—The old scheme of connecting Mukden by railway with Kirin, via Hailungcheng, Itungchou, and Shuangyangho, has been revived by Chairman Liu, of the Chinese Guild, Kirin says the "Manchuria Daily News." The Chinese Guild has approved of this scheme, and the share capital is open for public subscription. The promoters wish to take up first the Mukden-Itungchou section with the object of building a branch line from Itungchou to Changchun. Their idea seems to be to attract to their railway the Chinese passenger traffic from Changchun which is only 30 miles from Itungchou.

Tokyo-Shimonoseki Express.—The inauguration of the Limited Express Trains between Tokyo and Shimonoseki has been a popular departure on the part of the Imperial Japanese Railways. The new service was started in June. The trains leaves the Shimbashi station at Tokyo at 8.30 every morning and arrive at Shimonoseki at 9.38 the following morning. They leave Shimonoseki at 7.10 p.m. each day and arrive at Tokyo at 8.25 p.m. the following day.

The seven cars of which the new trains consist comprise a mail and beggage car, second-class cars, a second class sleeping car, a dining car, a first-class passenger car, first-class sleeping car and observation car. Generally speaking the new express may be called Trains-de-Luxe, leaving nothing to be desired in point of appearance, equipment, and accommodation. The dining cars, and the observation cars are particularly noticeable, the former being far larger and more roomy than those hitherto used in Japan and the interior conspicuous for the thorough improvement effected in every detail that may add to the comfort and convenience of passengers. The observation cars are for the use of first class passengers only, and consist of three sections, namely compartments for passengers, the library, and the compartment for the purposes of observation. This last section is provided with upholstered wicker chairs and smoking tables, etc. With large clear window panes, on each side, the car gives a most satisfactory view of the country through which the train passes. The carved wood ceilings, the electric lamps in the shape of Japanese lanterns, and the paper-screen like ventilating windows—all these give the cars a peculiarly Japanese touch.

It may be added that each carriage of these new Expresses, of which there are five for

service at present, was constructed at cost of from Y. 10,000 to Y. 18,000.

Proposed Peking Tramway.—A foreign firm has arranged to advance the Chinese Government eight million marks in one year in return for a concession of the right to construct a tramway in Peking costing the same amount. It appears that a Chino-foreign company will be formed under the direction of prominent Chinese. It is understood that the Peking tramway scheme provides for the construction of lines outside Peking. A scheme for the construction of lines inside the city is under consideration.

Burma-Szechuen Line.—A resident of Yunnan gives the following as the reasons for the occupation of Pienma by the British. In an interview published by the "China Tribune" he is credited with saying: "Several years ago, Great Britain acquired the concession for the Yunnan-Burma Railway. But owing to the very difficult engineering work to be encountered on the section between Bhamo and Tengyueh via Nungchang on account of the extraordinary mountainous nature of ground, she was desirous to obtain a new line to reach Szechuan by crossing through Yunnan Province. With this in view she was exploring the border line to see if she could find any likely place from which she could stretch her projected line with less difficulties. She soon discovered that the construction of a railway from Michina, the northern terminus of the Burma Railroad to Pienma, could be carried out with comparative ease, and that it would prove to be far more advantageous on both financial and economic relations than the projected Tibet-Szechuan Railway, which is to be stretched across Tibet to Chengtu via Yatung. Thus situated, she took hold of demarcation question, but her real idea is to abandon the Yunnan-Burma Line, and start one from Michina to Pienma, and thence stretch it to the capital of Szechuan, via Yunnan Fu, or from Pienma directly to Chengtu Fu."

Baguio Line.—The work of the Manila Railway Company is being pushed on rapidly. Over 900 men are now employed at the Baguio end, from where more than six kilometers of grade have been completed towards Aringay, on the coast. At the Aringay end 1,200 men are working. Hydraulic streams from the Irosen river are being used to cut down the dirt grade, the power being supplied by little giant hydraulic pumps. The main tunnel of this line has already been driven 50 meters into the cliff. From Aringay toward San Fernando the road is nearly completed, in fact the trains are running through to the Bauen river, and from there a perfect automobile road is available to the latter town. The Bureau of Public Works is arranging to run an automobile line over this section, as soon as the railroad gets the first train to the river.

Light-Rail Over Tumenling Pass.—The construction of a light-rail line winding up and down Tumenling Pass on the Kirin-Changchun Railway is now ready for service. The rapid progress has been made possible by securing from Tientsin a gang of 200 skilled hands, in order to re-enforce the 600 regulars which have been put on since the plan of building the line was adopted last spring.

Proposal to Bridge Johore Strait.—The Federal Council (Malay States) has approved the appropriation of $12,000 to meet the cost of the borings and other preliminary investigations for the construction of the proposed bridge over the Johore Strait. The Chief Secretary said that the Government was not committed to such a project but it was worthy of consideration. He estimated that the cost would be about $3,800,000. The proposed bridge was a very necessary addition to the railway system of the Federated Malay States. At present there was much delay in bringing goods up from Singapore. If there was a bridge it would be possible for goods to be loaded at the docks in Singapore, and brought straight to the Federated Malay States. The total additional cost, including a diversion and raising of the line, would be $4,100,000.

Federated Malay States Lines.—The General Manager of the Federated Malay States Railways (Mr. P. A. Anthony) reports a highly satisfactory working of the railways during the past year. A striking feature was the great increase in the number of passengers carried—10,347,896, as compared with 7,262,830 in 1909, an increase of 42.47 per cent. in two years. Goods traffic increased from 653,663 tons in 1910 to 780,780 tons in 1911, or 19.4 per cent. of increase. These increases have taxed the capacity of the rolling stock to its utmost limits, and a large programme for additional stock will be necessary to enable the management to keep pace with the development of traffic. The gross earnings from all traffic increased by 20.28 per cent., working expenses by 4.3 per cent., and the net earnings by 45.9 per cent. The dividend earned was 6.03 per cent., being the highest since 1903. There is a total of 559 miles of line open to traffic, and with the Johore and Singapore lines there is now a total of about 700 miles of railway lines in the Malay Peninsula. This will be added to during the current year, as the extension of the line through Pahang is being pushed on in order to carry the system through the State of Kelantan to the Siamese frontier. The capital account of the open lines in the F.M.S. (inclusive of motor services) now stands at £6,383,217, an increase of £341,741 over the previous year. A portion of this was expended on the new passenger station at Kuala Lumpur, the capital of the Federation, where there is now a fine station hotel. New restaurant cars, fitted with electric lights and fans, were added to the rolling stock, as well as additional rolling stock for the night service to Singapore, night travel being a new feature in Malaya since the completion of the line through Johore. These sleeping saloons and dining cars will bear comparison with those in use on any other railway. The capital account of lines under construction and surveys amounted to £507,928 on Dec. 31, 1911, and though the major portion of this sum was expended on the Pahang-Kelantan extension it may be mentioned that a portion was spent on surveys of a route on the West Coast carrying a line from Province Wellesley into the State of Kedah. The gross earnings from all sources, including motor services, amounted to £823,513, or an increase of £138,854 over 1910; and the gross working expenses were £440,698, as against £422,500 in 1910.

Indian Railway Profits.—In the administration report on the railways of India for 1911, it is stated that during the year there were 755 miles of line opened to traffic, bringing the total open mileage up to 32,839 miles. There were also 841 miles of lines sanctioned, and at the end of the year 263.78 miles were under construction.

The actual capital outlay, excluding premia for the purchase of companies' lines from the commencement of operations on all open lines, amounted at the close of the calendar year 1911 to Rs. 45,006.80 lakhs and that on lines under construction to Rs. 955.48 lakhs. In addition, Rs. 130.12 lakhs were incurred on miscellaneous items, English stores, &c., connected with railways. The total outlay amounted to Rs. 46,092.40 lakhs. The actual expenditure on open line rolling stock and on other open line expenditure during the year 1911 amounted to 351 lakhs and 573 lakhs respectively.

The fullest details are gone into in the report, but a summary of the earnings, showing the financial result to the State during the year 1911, after meeting, in addition to the expenses of working, all charges for interest on capital outlay by the State and on capital raised by companies, also annuity payments connected with the purchase of railways by the State, was a net gain of Rs. 406.94 lakhs (£2·71 millions). This result, however, is arrived at after inclusion in the charges against revenue of a sum of Rs. 135.63 lakhs (£904,000), representing the portion of annuity payments in redemption of capital. Omitting this item, which is not properly a revenue charge, the true result for the year is a net gain of Rs. 543 lakhs (£3·62 millions). The gross earnings of all Indian Railways amounted in round figures to Rs. 5,527.92 lakhs, compared with Rs. 5,114.22 lakhs in 1910. The net earnings amounted to Rs. 2,644.00 lakhs, against Rs. 2,398.50 lakhs in 1910. These net earnings yielded a return on capital outlay of Rs. 45,006.80 lakhs on open lines—*i.e.*, on mileage earning—a revenue of 5.87 per cent., as compared with 5.46 last year.

Regarding passenger traffic, the total number carried was 389·85 millions, against 371·58 millions, and the earnings therefrom amounted to Rs. 1,849.08 lakhs, against Rs. 1,712.04 lakhs. The number of third-class passengers carried was more by 16·02 millions and the earnings therefrom by Rs. 107.99 lakhs. The increase of Rs. 137.04 lakhs in the passenger earnings was contributed chiefly by the North-Western Railway (Rs. 26.84 lakhs), the East Indian Railwap (Rs. 16.08 lakhs), the Great Indian Peninsula Railway (Rs. 12.35 lakhs), the Bombay, Baroda and Central India Railway (Rs. 10.03 lakhs), the Eastern Bengal Railway 3 ft. 3⅜ in. gauge section (Rs. 9.20 lakhs), the Oudh and Rohilkund Railway (Rs. 8.69 lakhs), and the Rajputana-Malwa Railway (Rs. 8.56 lakhs), and was due to the development of traffic and to the Coronation Durbar, held at Delhi.

The aggregate tonnage of goods moved during the year 1911 was 71.27 millions of tons and the earnings therefrom were Rs. 3,293.32 lakhs, an increase over the previous year of 5·67 million tons and of Rs. 250.15 lakhs in earnings. Of the increase in the goods receipts the East Indian Railway contributed Rs. 48.05 lakhs, or 19.21 per cent. and the North-Western Railway Rs. 36.69 lakhs, or 14.67 per cent., while remainder was contributed principally by the Bengal-Nagpur, the Great Indian Peninsula, the South Indian, the Bombay, Baroda and Central India, and the Rajputana-Malwa-Railways.

The number of passengers killed from causes beyond their own control was 0.03 per million of passengers travelling, which gives an average of one in 1,197.74 millions of miles travelled.

Shanghai Nanking Railway.—The half-year ending June, 1912, was a prosperous one. The earnings totalled $1,407,000, whilst the working expenses stood at $821,000, the net earnings thus being $586,000. For the 33 weeks ended August 17 the figures stood as follow:

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912	1,456,434	235,119	1,691,555
1911	1,101,972	138,885	1,290,857
Increases	354,462	96,234	400,698

Shanghai Tramway Returns.—The returns of the Shanghai Tramways (Foreign Settlement) for the week ended August 14 are as under:—

	1912.	1911.
	$	$
Effective receipts (after deducting loss by exchange)	16,242.29	11,933.55
Passengers carried	841,315	562,575
Car miles run	54,257	43,447

The loss by Exchange of subsidiary coinage for the week was equal to 24.09 per cent. of the gross cash collected on the cars as compared with 23.78 per cent. for the corresponding week last year.

For week ended August 21 they are :—

	1912.	1911.
	$	$
Effective receipts (after deducting loss by exchange)	15,003.40	12,401.59
Passengers carried	783,134	572,429
Car miles run	52,771	45,660

The loss by exchange of subsidiary coinage for the week was equal to 24.45 per cent. of the gross cash collected on the cars as compared with 23.30 per cent. for the corresponding week last year.

ROADS AND BRIDGES

Developing Manila.—For the construction of Calle Dasmarinas, a street to replace or supplement the Escolta, Manila, as a business street, a sum of P200,000 has been set aside from the P736,000 loan secured from the Insular government. This is the street which is finally to replace, or supplement, the Escolta, as a business street. It lies parallel with the latter thoroughfare and about 200 meters to the eastward, one section of it already being of full city street width. The intention is finally to extend it to the Binondo canal on the west, and to Santa Cruz on the east, which will relieve the congestion on the Escolta, as well as affording on opportunity for the expansion of the retail district.

Another appropriation, this one of P50,000 will be utilized for widening, straightening and otherwise improving Calle Echague, from Plaza Goiti to the San Miguel bridge.

The loan of P736,000 has been obtained from the insular government by the city of Manila, for permanent improvements. The sum obtained is part of the gold reserve, and will draw interest at the rate of 3½ per cent per annum. The loan is for ten years, and will be used for bridges and permanent street improvements, although an additional loan may be required for the three bridges on Azcarraga, which will require a considerable sum.

There are ten projects in all upon which the loan will be spent, and may be identified as follows:

No. 1. For the construction of a Central School building, P100,000.

No. 2. For constructing and widening calle Dasmariñas from calle Rosario to calle Nueva, P200,000.

No. 3. For constructing and widening calle Echague, P50,000.

No. 4. For the construction and extension of calle Ayala from calle Marques de Comillas to calle San Marcelino, P55,000.

No. 5. For the construction and extension of calle Tayuman from calle Cervantes to calle Anloague, P13,000.

No. 6, For the construction of Prim Bridge, Azcarraga Bridge and Orda Bridge, on calle Azcarraga, P76,000.

No. 7. For the construction of streets, gutters and other improvements, in sanitary barrios, and for improving, draining and filling land belonging to the City of Manila, P100,000.

No. 8. Eor completing the construction of Tondo Market, P17,000.

No. 9. For constructing and improving streets not otherwise specifically provided for by loans, including in all the expenditure of P111,000.

Of project No. 9 the sum of P61,000 will be spent as follows:

Treatment of asphalt pitch and tar of calle Echague, calle San Miguel, Calderon de la Barca, part of Anloague, and part of Plaza Goiti P22,000; Improvement of Taft Ave., North of calle Herran, P14,000; construction between San Andres and Vita Cruz, P6,000, and sundry minor projects of new street construction, P2,000.

For general widening, straightening and opening of streets, P50,000.

No. 10. For the construction of 12 midden sheds and sanitary construction in the public market and midden sheds, P14,000.

At the close of the fiscal year, 1913, in all there will be 200 midden sheds scattered throughout the city. Total P736,000.

Projects Nos. 7, 9 and 10 are contemplated almost wholly for expenditure on the north side.

Oil on Manila Roads.—The application of oil to the surface of the Las Piñas San Pedro-Tunasan section of the Manila South Road was completed about June 1. The oil was applied to 15.2 kilometers of road. For the purpose of comparing the maintenance costs of oiled and unoiled roads, 2 kilometers were not oiled. One of these kilometers is straight and the other kilometer has several curves, thus giving the result upon both straight and curved roads. Kilometers 1 and 2 of the Manila South Road have been resurfaced with an asphalt pavement. The pavement has a width of 5 meters. Kilometer 3 has been resurfaced and treated with an application of asphaltic oil, possessing a specific gravity of 0.97 Resurfacing is now under way on kilometer 4. Stone has been delivered at Malabon for resurfacing kilometers 1 and 2, and one-half of kilometer 3 of the Manila North Road.

The Pasay-McKinley Road has been completed from Fort McKinley to the Pasay Plaza. The length of completed road is about 5 kilometer. The surfacing is composed of 4 inches of broken stone laid upon a foundation of adobe stone averaging 10 inches in depth. The width of metalling is 4 meters. The U. S. Army furnished the transportation, both water and land. for this project. It is expected to have a new road connecting the Pasay Plaza with the Manila South Road completed by July 15.

Philippines Provincial Roads.—Special allotments made by the Secretary of Commerce and Police of the Philippine Islands, from funds provided under Act 2059, recently released by the Governor General, in the amount of P638,-800 which is to be allotted as follows for the fiscal year 1913:

Ambos Camarines.—For the reconstruction of the first class road between Nueva Caceres at Iriga, P20,000.

This allotment conditioned on the securing of a loan by the province of P20,000 for one half the cost of the construction of a concrete bridge over the Argus River to the provincial boundary, the province of Albay to meet the other half of the cost.

Bulacan and Nueva Ecija.—For the construction of the Manila-North Boundary road from San Miguel, Bulacan, to Gapan, Nueva Ecija, P100,000.

Iloilo:—For the construction of provincial road work within the limits of the city of Iloilo, P25,000.

This allotment conditional by the appropriation by the province and the City of Iloilo jointly, of an additional P25,000 for the work.

La-Laguna.—For the completion of the San Pablo-Tiaong Road, P15,000.

Pangasinan.—For the completion of the Villasis-Urdaneta-Binalonan Road, P25,000.

For the maintenance of the road from Bobonan, Pangasinan to the Benguet boundary line P10,000.

Rizal.—For the maintenance of the Manila-North Road from Manila city limits to the Bulacan boundary line, P5,000.

For the maintenance of the Manila-South Road from Manila city limits to San Pedro Tunasan, P15,000.

Road Prizes.—For road prizes to be awarded on the recommendation of the road committee, P30,000.

Foreman and Capataz Prizes.—To be awarded as above, P5,000.

Road Committee.—For the expenses of the road committee, fiscal year 1913, P5,000.

Bureau of Public Works.—For experimental road and bridge construction and maintenance work, by the bureau of public works including the use of asphalt, oil and other bituminous binders, P30,000.

Capiz.—Panilan-Pilar Road, P50,000.

Rizal.—Maintenance Pasay-McKinley Road, P5,000.

Cavite.—Dasmarinas-Silang Road, P33,000.

Ilocos Norte.—Laoag Bridge, P50,000.

Iloilo.—Feeder roads, P100,000.

Allotment not yet made. Secretary of Commerce and Police, awaiting final recommendation of the director of public works.

(Survey and estimate Dueñas-Lumbanao-Viejo road not finished).

Balance for contingency, P5,800.

MINES AND MINERALS

Malay Tin.—During June 3,472 tons of tin were exported from the Federated Malay States, as compared with 3,775 tons for the corresponding month of last year.

The Moji Coal Trade.—The total shipment of coal from Moji during June last was 188,784 tons; an increase of 21,150 tons on the figures for the previous month. The quantity shipped to foreign ports alone was 81,204 tons, including 36,540 tons to Hongkong, 14,600 tons to Manila, 12,100 tons to Honolulu, 6,850 tons to Rangoon, 6,700 to Colombo, 3,400 tons to Batavia, and 1,014 tons to Shanghai. Coal forwarded to home ports was 41,517 tons, and that taken by foreign and Japanese vessels for their own use 45,655 tons and 20,408 tons, respectively.

Lungkoshan Silver Mines.—The area of the silver mine of Lungkoshan is about 100 square *li*. The Civil Governor has decided to send deputies to consult with the gentry as to the best plan to develop the mine so as to prevent local opposition based upon superstitious belief. The mine will be developed in co-operation with the people. They may invest their money in the enterprise and the mine owners may take proportionate shares. The method of development is semi-modern, as funds are not enough to start the work in full swing.

Output of Indian Mines.—During June the output of the Indian gold mines was 47,969 oz., showing a decrease of 722 oz., as compared with the preceding month and an increase of 935 oz., as compared with the corresponding period of 1911. The production since the beginning of 1908 has been as follows :—

	1908.	1909.	1910.	1911.	1912.
	oz.	oz.	oz.	oz.	oz.
Jan.	45,598	47,031	46,548	47,163	47,988
Feb.	44,214	41,898	45,464	45,448	46,731
Mar.	45,582	46,079	47,035	47'126	47,981
Apr.	45,352	46,128	46,842	46,981	48,259
May	45,368	46,514	46,815	47,202	48,691
June	45,687	46,475	46,754	47,034	47,969
July	45,862	46,700	47,006	47,591	—
Aug.	45,586	47,038	46,934	47,730	—
Sept.	45,155	47,274	47,958	47,992	—
Oct.	47,360	47,254	47,220	47,076	—
Nov.	47,716	47,179	47,272	49,100	—
Dec.	52,409	54,318	48,419	52,186	—
Total	555,889	563,888	564,276	573,529	287,619

Gold Dredges for Paracale.—Messrs. J. W. McWhae and R. Y. Hanlon who returned from Hongkong, recently predicted that the dredge of the Philippines Bucket Dredge Company, Ltd. would be installed within the next three months on the company's ground on the Paracale River. The first shipment comprised twenty-five tons of machine shop equipment and other consignments are expected from time to time in Manila and will be forwarded promptly to the ground. The second dredge ordered by the company in Australia will arrive in Paracale about the first of September.

New Burma Company.—When last mail left Mandalay the prospectus was out for a new lead company to be called "The Oriental Mining Company, Ltd." The capital was fixed at Rupees 2,000,000, and the object is to

acquire by purchase from the vendor, Mr. C. Soon Thin, of Mandalay, the Mining and Prospecting Leases which have been granted to him by the Government in the Wuntho Sub-division of the Katha District and which are known as Mawkhwin and Mawkhar Lead mines, each covering an area of two miles by one mile or containing in all 1880 acres each.

It is proposed to erect two smelters and furnaces capable of discharging 10 tons each in 24 hours at sites convenient to the mines in order to avoid unnecessary transport charges. Assays yielded 69 per cent. of lead, 33 oz. 15 dwt., 4 grains of silver per ton of lead.

Chinese Engineering and Mining Co.—The "Mining Journal" (London) learns that "the issue of £1,200,000 six per cent. first mortgage debentures just made by the Chinese Engineering & Mining Company, Limited, has been fully subscribed, and that the underwriters have been entirely relieved. This result is explained by the character of the enterprise as demonstrated by the dividend record of the old company, the powerful international interests concerned in it, and the fact that all difficulties in China have been removed by the arrangements effected through the British and Chinese Governments. The concern is one which appears certain to increase in importance with the industrial development of China."

The New Franco-Japanese Bank.—Financial circles have been greatly interested in the establishment of the Franco-Japanese Bank, negotiations for which have been proceeding for some time. The first inauguration meeting was held on June 24, and on July 3 the second inauguration meeting was held, when the establishment of the Bank was complete. The capital of the Bank is 25,000,000 francs or about 10,000,000 yen, of which 6,000,000 yen will be raised from French capitalists and the rest from Japanese. Of the 20,000 shares (yen 4,000,000) to be taken up in Japan 12,000 shares will be subscribed for by the Japan Industrial Bank, 2,500 each by the Daiichi, Mitsui and Mitsu-Bishi Banks, and 100 shares each by Bank, 2,500 each by the Daiichi, Mitsui and Mitsu-Bishi Banks, and 100 shares each by Viscount Mishima, Mr. Konojo Tatsumi and three others who will be the directors of the new bank. The Daiichi, Mitsui and the Japan Industrial Banks will accept the shares in the name of the banks, but it is not certain whether the Mitsu-Bishi Bank will do the same or not.

The President of the new Bank will be Mr. Guelnot who has long years' experience both as a Government and a private financier, and Dr. Soyeda, President of the Industrial Bank of Japan will be the Vice-President.

As to the appointment of the board of directors from the Japanese side, it was decided that beside Dr. Soyeda, who will be the Vice-President, and a French director to reside in Japan, two directors will be nominated by Dr. Soyeda from among the directors of the Japan Industrial Bank, and another candidate, not in any way connected with the associate banks, will be nominated by Marquis Inouye, and Financial Minister Yamamoto and will be the managing director. The representatives of the associate banks will have a voice in the management of the banking business as advisers, Viscount Mishima, Baron Shibusawa, and Mr. Hayakawa having consented to be such advisers. Baron Iwasaki will be the adviser in name, for the Mitsu-Bishi Bank, but Mr. Mimura will be present in all the deliberations. Marquis Inouye and Financial Minister Yamamoto are said to have in view for Managing-Director a man who is now a member of the Imperial Diet and who had once been a director of a Colliery Company.

As to the principle of the business of the new bank, it was first intended that investment on a large scale in all enterprises in the Far East in general should be undertaken. Though this principle has never been abandoned, an important objection has been raised to this point as that nothing definite had been arrived at for a long time. As the result of this objection, it was agreed upon that the objects of the Six-Power Loan to China may not be encroached upon, and that the activity of the bank in China will be slow but steady so that there may be a wholesome progress of the work of the bank. Therefore, the work to be undertaken by the new bank will be nothing but a general banking business, the undertaking of the issue of debentures, and other similar work. The bank will open its business as soon as the appointment of the board of directors and the registration of the Japan branch office is finished.

In France, the best site near the Bourse has been selected for the institution and the appointment of the Manager and Vice-Manager and all the employees have been made. The business will be opened as soon as the building of the bank will be finished. Viewed from the French standpoint, the establishment of the bank can now be said to be complete. In Japan, the preparations for opening the business are being pushed on steadily. The relation between the Japan Industrial Bank and Baron Guntsburg has come to an end by the establishment of the Franco-Japanese Bank, and the Japan Industrial Bank will be hereafter represented in France by the Franco-Japanese Bank. The stockholders of the Franco-Japanese Bank includes, besides la Société Générale, Banque de Paris and Juichi Soyeda who acted as the promoters, all the notable banks in France, England and Russia.

Kwangtung Loans and Finance.—A domestic loan of $10,000,000 which is to be raised by the Kwangtung Government will be used only for internal improvements and productive industrial enterprises. Governor-General Wu Han Man declared that the Government will lend millions for productive enterprises but not a cent for administrative purpose. Commissioner of Civil Affairs Chien Shih Fan will spend a part of the loan for the construction of a tramway in Canton, to improve Ta-Sha-Tao, a small island in front of Canton, and to build markets within Canton city.

The $5,000,000 the Hongkong and Canton merchants are raising to form an association to back up the Kwangtung Government notes will become the base for the ten million dollar bank to be organized to act as the treasury of the government.

Luk Yau, a well-known capitalist of Singapore, will organize at Canton a private bank with $10,000,000 capital also. He expects to raise most of the capital from merchants abroad.

The Chung Kuo Bank.—In Peking this bank (formerly the Ta Ching Government Bank) has begun business transactions, and has issued banknotes of three denominations, $1, $5 and $10, for circulation in the capital.

Russo-Mongolian Bank.—It has been decided that a Russo-Mongolian bank, to be named the Romo Ginko, shall be set up in Kulon to assist in the development of Mongolian trade and commerce. Russian financiers will provide the money and discharge all banking duties needed for the purposes of this new enterprise. In Tokyo it is evidently considered that this undertaking will occupy in history a place similar to that held by the Russo-Chinese Bank a few years ago.

Hongkong and Shanghai Bank.—The Directors on August 17, submitted a General Statement of the affairs of the Bank, and Balance Sheet for the half-year ending 30th June, 1912. The net profits for that period, including $1,953,135.15, balance brought forward from last account, after paying all charges, deducting interest paid and due, and making provision for bad and doubtful accounts, amount to $4,869,054.88. The Directors recommend the transfer of $250,000 from the Profit and Loss Account to credit of the Silver Reserve Fund, which Fund will then stand at $17,000,000. They also recommend writing off Bank Premises Amount the sum of $250,000.

After making these Transfers and deducting Remuneration to Directors there remains for appropriation $4,354,054.88, out of which the Directors recommend the payment of a Dividend of Two Pounds Sterling per Share, *viz.*, £240,000, which at 2/0$\frac{1}{16}$, the rate of the day, will absorb $2,393,766.24, the Balance $1,960,288.64 to be carried to New Profit and Loss Account. The holding of $1,200,000 2½% Consols has been written down by £24,000 to £900,000, and now stands in the Books at 75; "Other Sterling Securities" have also been written down to the extent of about £9,500. To effect these adjustments and maintain the Fund at £1,500,000, British and Indian Government guaranteed stocks to the face value of £41,500, costing £33,569, 1s. 3d., were purchased and added to "Other Sterling Securities" bringing the amount under that heading to £406,500 written down to £335,400. This expenditure was met out of the earnings of the half-year.

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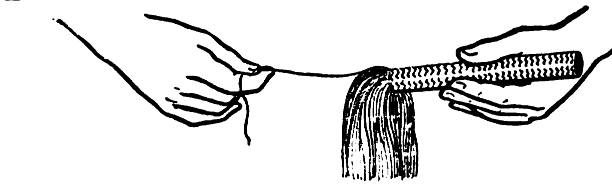

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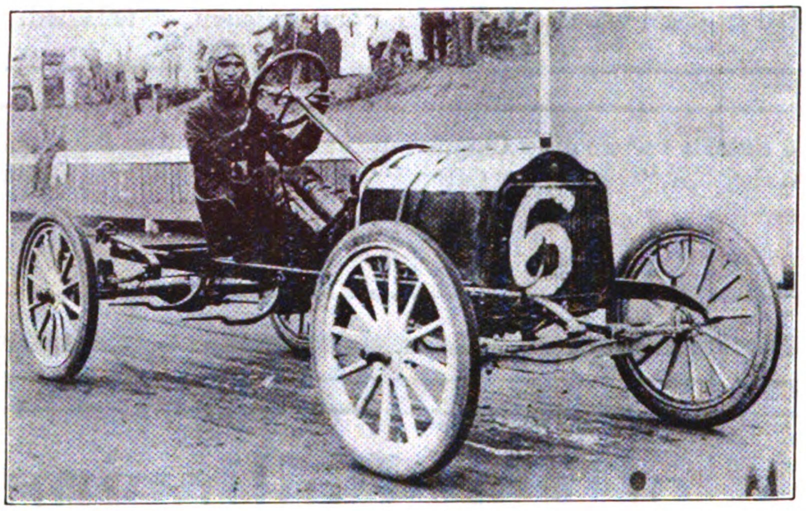

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EX PRESIDENT DR. SUN YAT-SEN
Appointed to Reorganize China's Railways

CHINA'S RAILWAY PROBLEMS

AN ANALYSIS OF DR. SUN YAT-SEN'S SCHEME ILLUSTRATING CHINA'S DIFFICULTIES IN FUTURE RAILWAY EXTENSION

(BY GEO. BRONSON REA)

CLOSING THE DOOR IN YUNNAN; OPERATION OF THE FRENCH YUNNAN RAILWAY
THE RAPE OF MONGOLIA; RUSSIA'S RAILWAY POLICY IN CENTRAL ASIA

THE CANTON-HANKOW RAILWAY, KWANGTUNG SECTION
PHILIPPINE RAILWAYS: KOREAN RAILWAYS
TIENTSIN-PUKOW RAILWAY: THE KALGAN RAILWAY AND EXTENSION
THE LOAN SITUATION

THE FAR EASTERN REVIEW

FOR SEPTEMBER, 1912

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SHANGHAI-MANILA

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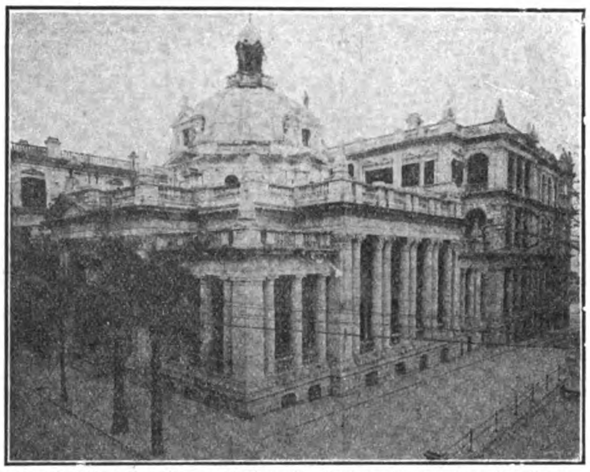

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THE FAR EASTERN REVIEW

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CHINA'S RAILWAY PROBLEMS

An Analysis of Dr. Sun Yat-sen's Scheme, Illustrating China's Difficulties in Future Railway Extensions

(BY GEO. BRONSON REA)

A Presidential Order of September 10 points out that "inasmuch as the development of the country rests chiefly on the introduction of means of rapid communication the construction and operation of railways are a national necessity," and appoints Dr. Sun Yat-sen "to consider and draft plans for a national system." The Mandate empowers him to submit whatever plans he may make to international financiers in order that the needed capital may be raised, and instructs him to finally tender the results to the Government for approval. Further, the President authorises Dr. Sun "to form and organise a Central Railway Corporation for the purpose of carrying out and effectuating the work hereby charged and entrusted to him."

This is something tangible, and places in the hands of Dr. Sun Yat-sen the most important work in the Republic. It, at the same time, vests him with a wide radius of action in the search for funds to equip China with the lines she needs to bring her even within measurable distance of adequate development. What method of procedure Dr. Sun will ultimately adopt to secure the best financial service has only been suggested, though Dr. Sun has not yet come to a final decision on the point. He is, and has been, however, besieged by all manner of men representing all manner of capital, and of them all he will be well advised to be wary. When he has arrived at the stage when a concrete and practical proposal may be placed before capitalists he will easily be able to find those who know most about the special business he has in hand, and likewise he will discover that they will be ready to listen to him. They will not only be able to tender him valuable advice on the subject now nearest his heart, but they will be able financially and technically to carry out any contract into which they may feel disposed to enter. There are numerous pitfalls on the financial highways and byways that must be guarded against, and Dr. Sun should be wise in time, study well the nature of the ground upon which he might be invited to tread, and keep a sharp and constant vigil for danger signals ahead

The outline of the scheme which Dr. Sun Yat-sen has in mind was first published in the FAR EASTERN REVIEW last July. Even yet no detailed plans have been devised. A work of such magnitude needs considerable prolonged study, and of late weeks Dr. Sun has had no leisure specially to devote to his hobby. The gastronomical battlefield of Peking has claimed most of his attention, but he has taken occasion by the hand to make post-prandial reference to the need of railways and on other occasions has delivered lengthy speeches on the generalities of his proposals. This is all to prepare the public mind. Even yet in China there is a great superstitious mass to contend against, and what is worse there is the agitating sections who have in the past used the alleged dangers of foreign loans for railways as the shibboleth to gain certain political ends. It is not at all unlikely that the slogan of the anti-everything party will now commence a series of geometric curves suggestive of the disconcerting habit of the far-famed boomerang and make a landing in an awkward place with an unpleasant thud. But that, of course, has to be considered part of the fortune, or misfortune, of war. To avoid being trapped in such a predicament Dr. Sun is gently breaking the news through the provinces, and it is hoped by him that his arguments of "railways for next to nothing" will entice the potential opponents to pocket their prejudices and permit the plans he has in view to be consummated.

His scheme, as has already been pointed out in this journal, consists of a series of trunk lines and inter-provincial connections. The southern trunk line extends from Shanghai to Canton through Kwangsi, Kweichow and Yunnan to Tibet and beyond to Tienshan. The central trunk likewise commences from Shanghai and traverses the provinces of Kiangsu, Anhui, Honan, Shensi, Kansu, and Hsinchiang, and extends to Ili, whilst the northern trunk starts at Chingwangtao and passes through Manchuria to Outer Mongolia, and on to Kobdo. The National Railway Union of China has a somewhat different idea, though it agrees with Dr. Sun's southern trunk line. It wants to see the shortest connections with Europe, and proposes that the central line should run from Kiangpei, northwestward through Kaifeng, Hsian, Lanchow, the southern slope of Tienshan to Kashgar, with ultimate extension to connect with the Pamirs, Kashmir, Persia, Asia-Minor and Constantinople, whilst the northern trunk should run from Peking through Sui-yuan, Uliasutai, Kobdo connecting with the trans-Siberian line at Tomsk.

During his sojourn in Peking Dr. Sun has certainly preached the gospel of the iron horse with vigorous consistency, and no opportunity has been allowed to slip which could be utilised to drive a wedge calculated to have some effect in splitting up the superstitions and the prejudices of the provincials. To the members of the Peking Press Association, which embraces the editors of all the forty or more papers of the capital, he explained that the Government must have foreign money, and that whilst evil consequences were experienced by the Manchu administration as a result of borrowing foreign money, they were due to wrong and careless negotiation rather than to the foreign loan as such. And he asked what line in China was not built with foreign money—stifling what might have been the jubilant retort: The Kalgan line! by adding that the money with which the Peking-Kalgan line was constructed was profit from the Peking-Mukden line, "and hence was still a loan borrowed indirectly, and not purely Chinese money." Then he suggested that he would get over the errors made in the past when security such as likin returns, custom duties, *et hoc*, was given for railway loans, by contracting a foreign loan of $6,000,000,000 and taking only one-fifth of the sum in hard silver and the balance in railway material, a proposal which, he believed, would commend itself to the bankers.

In ten years he hopes to have 200,000 li of railways built. During the first two years the loan would be negotiated, the

next three would be devoted to the perfection of the survey of the lines, and the end of the following five years would see the completion of the series. Chinese workmen to the number of 2,000,000 could be employed to effect that desideratum. At the meeting of the Railway Union he worked that point out for the benefit of his hearers. "Supposing that ten men can," he said, "in one year, build one li of railway, 200,000 men should be able to build 20,000 li in a year, and 2,000,000 men 200,000 li. Cannot," he asked, "we find among our 400,000,000 people 2,000,000 men to build our railways?" It may not, he added, be easy to organise one company to undertake that tremendous programme, but they could organise several companies. To convince his hearers he described how America prospered in railway enterprises. "The railways in the United States bring in every year," he declared, "a net interest of $1,500,000,000 (silver) and within ten years repay the invested capital. With a population of 400,000,000, and an area of 2,500,000 square miles awaiting railways for colonization and development, China's future railway returns should be proportionately greater, or four times more than those of America."

But the strongest appeal of the ex-President to the people for co-operation was made on other grounds. He appealed to their patriotism, dilated upon railways as a necessity in self-defence, and enlarged on their influence upon political development and the spread of civilisation. "The aggressive policy of Russia in Northern Manchuria and in Mongolia, the freedom of action of Japan in Southern Manchuria, and the monopoly by Great Britain of influence and authority in Tibet, are all," he said, "a challenge to our military prowess in defending our frontiers." And generally he emphasised his wish for popular confidence in words similar to the following, which are quoted from his speech to the Press Asociation. "The construction of railways in China to-day is a question of imperative necessity, and one of life and death to the Republic. The chief authority under a popular government rests with the people. It is their approval or non-approval that settles and decides everything of importance. If my scheme be favourably received by the people in general, I shall try to push it to a successful conclusion within ten years. You are representatives of the public opinion, and I hope that you will use every means within your power to enlighten them on the necessity and benefits of railways so that the scheme which I have carefully explained to you will, by their support, become a reality."

The issue of the Presidential Mandate referred to at the outset of this article is the first practical step, and now it is upon the shoulders of the ex-President to evolve a scheme which will be acceptable to foreign financiers, and make arrangements with them which will be acceptable to the members of the National Council at Peking, and the rights-loving people of the various provinces. Dr. Sun has a big task ahead of him; and at least in the suppression of popular distrust of foreign influence through its financia' investments no man could equal him. Once he has the popular will on his side the rest should be easy, if he adheres strictly to the practical.

One of the most important items is the estimated cost of the lines. For rough calculation the Chinese li (1,458 English feet) may be taken as one third of a mile. Dr. Sun's scheme, 200,000 li is about 67,000 miles in round numbers, and his estimated cost is $6,000,000,000 silver, or roughly $3,000,000,000 gold. This gives an average cost of $30,000 silver per li, or $90,000 silver ($45,000 gold) per mile. The cost of loan built railways in China has generally exceeded this figure, while less pretensious lines constructed under native management has been much lower. Eliminating many of the expenses attached to the ordinary Chinese railway loan, a fair average estimate of the cost of building and equipping a mile of standard guage railway in China, is exactly the figure quoted by Dr. Sun. Some lines across level country might be built cheaper, and some of the mountain sections at a cost much higher. If China had her own engineers with the experience of Jeme Tien-yu, Yen Te-Ching, K. W. Kwong, K. S. Loh and others, enabling her to dispense entirely with the service of foreigners, the lines could be constructed at an average of $30,000 gold per mile. The world's great construction firms like, J. G. White & Co., Pearsons' or Paulings', with their experience in Asiatic railway construction would undoubtedly be glad to contract at an average price of $40,000 gold per mile for the construction of a complete system. So it may be accepted that Dr. Sun's estimate as a basis for loan or construction negotiations is a sound one.

The plan as outlined is so extensive and comprises so many features conflicting with other interests, that even partial success can only be secured through the exercise of the most careful diplomacy and financial shrewdness. The construction of new railways in China, is the most difficult problem confronting the new government. It was so under the old regime, and the revolution has not altered conditions to any great extent. It was the rock on which the old ship of state was wrecked, and unless a safer course is steered in the future, the new bark will also be swept by the currents straight for the reefs and be split asunder without warning.

The policy of foreign powers in China finds expression in the history of her railway development, and the construction of any new railway conflicting or competing with their existing lines and future schemes, has met in the past with firm opposition. It is not safe for China to construct railways in certain sections of her vast territory. As long as her officials content themselves with dreams, and no attempt is actively undertaken to put into practice the schemes for constructing such lines, the interested foreign Powers preserve silence and refrain from interference. The past is a safe guide for the future, and we know that when certain railway projects assume tangible form, and loan negotiations for their construction are opened with some hope of a successful issue, the polite cloak of diplomacy is discarded, and China is warned in no uncertain terms, what will happen if the scheme is not abandoned.

The construction of other lines are hampered by the existence of treaties, concessions, understandings, and loan contracts to such an extent that a thorough and intimate knowledge of the many delicate points involved is essential to avoid a clash with foreign commercial interests through their respective legations. In addition to the perplexities arising from the collision with foreign political and commercial interests, there remains the extremely disagreeable and dangerous task, to the Chinese official at least, of finding an amicable and equitable solution to the conflict between the Central and Provincial governments. The astute officials of the old regime repeatedly shirked this problem, and one by one, Presidents of the old Railway Board, quietly quit their lucrative post rather than incur the certain hostility of the Provinces, by an attempt to infringe on their rights. It remained for Sheng Kung-pao the last Minister of Railways under the Manchus to put into effect the Railway Nationalization scheme. The revolution was precipitated. To appease the wrath, of the provinces, the Central Government offered up Sheng as a sacrifice. He was cashiered and anathematized in Imperial Edicts, and barely escaped with his life to Japan.

The country has been so occupied with other important matters since the revolution, that the great question involving the relation of the Provinces to the Central Government has been temporarily shelved. Before any great railway scheme can be safely put into practice, this matter must be settled to the satisfaction of both sides and incorporated in the new constitution, otherwise there will be a continuous conflict between the Central and Provincial authorities concerning the construction and regulation of the railways. Dr. Sun has the confidence of the Southern Provinces, and there is little doubt but that he could secure their adhesion to and permission for any scheme he might originate. It is doubtful however if any other man in China could reconcile the various elements, and if sickness or death intervened to terminate Dr. Sun's connection with the great plan, is there another man who embodies his qualities and could take up his great work and carry it through?

Dr. Sun's scheme as reported embraces three new trunk lines, North, South, and Central, in addition to many branches or feeders connecting the smaller cities with the proposed and existing systems. In the execution of this scheme there are powerful foreign and domestic political influences to overcome, existing railway rights to adjudicate upon, intricate financial problems and terms to determine, and stupendous engineering obstacles

to surmount. By a careful analysis of these opposing influences, we can arrive by a process of elimination at a fair appreciation of the value of Dr. Sun's scheme and its chances of success.

Dr. Sun's plan includes the construction of a northern line commencing at Chinwangtao, round Liaotung into Inner and Outer Mongolia to Uranhai In other words the Northern system is to be constructed in opposition to the rights either acquired or otherwise arrogated to themselves by Russia and Japan. The Peking agreement of December 22nd, 1905 entered into between China and Japan contained a secret clause which bound China, not to construct, prior to the recovery of the South Manchurian Railway any main line in the neighbourhood of and parallel to that railway, or any branch line which might be prejudicial to its interests. This self denying clause, in which China in effect surrendered her sovereign rights to construct railways in Manchuria, was made public and successfully invoked by the Japanese Government to obstruct and cause the abandonment of the projected Fakumen Railway, a branch line of the Northern Railways from Hsinminfu to the market town of Fakumen. China had entered into a signed agreement with a British financial corporation to supply the funds and contracted with a British construction firm to build the line. China's undoubted intention was to test the strength of the secret agreement referred to, and if Japan acknowledged her right to build the Fakumen extension, the line was to be carried on northwards towards Changchun.

Japan's railways already connect up the main commercial centers of South Manchuria and with the completion of the Chino-Japanese Kirin-Changchun line, and its prolongation to the coast at Hunchun by Japan, there is little scope for further commercial lines in this province. It is true that China could and would be allowed by Japan to construct a few insignificant local feeders to the South Manchurian system, but these would have no bearing on the general scheme, nor be of sufficient importance to merit the consideration of foreign capitalists.

Dr. Sun's schemes provide for the extension of the Kirin Changchun line, northeastwards to Ninguta, with a line from this point southeast to Hunchun, and also for a branch line from Kirin extending southwards to the Chentao district on the Yalu.

Section b, Clause 3 of the Convention between Japan and China regarding the Hsinmin-Mukden and the Kirin-Changchun Railways signed at Peking April 15, 1907 provides as follows :—

"*If the Kirin-Changchun line should hereafter build branch lines or an extension, the construction of such lines shall rest of right with the Chinese Government, but, if there shall be a lack of capital, application should be made to the South Manchurian Railway Company for an arrangement. Should China, however, appropriate funds herself for the construction of any other railway lines than these mentioned, it shall not concern the South Manchurian Railway Co.*"

The Manchurian Agreement of September 4th, 1909 furthermore provided as follows :—

"*The Government of China shall undertake to extend the Kirin-Changchun Railway to the southern boundary of Yenchi, and to connect it at Hoiryong with a Korean Railway, and such extension shall be effected upon the same terms as the Kirin-Changchun Railway. The date of commencing the work of proposed extension shall be determined by the Government of China, considering the actual requirements of the situation and upon consultation with the Government of Japan.*"

In view of the immense strategic importance attached to these railway projects, Japan would never consent to forego her undisputed rights to finance and construct them. Dr. Sun's idea of extending the Kirin Railway to Ninguta, and building a branch from there to Hunchun, reopens the delicate question of Russian and Japanese rights in Manchuria. The extension according to treaty must be financed by Japan and as it cuts the Russian Chinese Eastern Railway half way between Harbin and Vladivostok, the Russian Government would immediately protest against this danger to her strategic position.

As to Northern Manchuria, Russia has prohibited China in the most emphatic terms from constructing railways which might be considered a menace to her strategical position or as likely to compete with the Chinese Eastern Railway. In seeking to circumvent the self-denying clause of the secret protocol to the Peking Agreement and ascertain the exact position of Russia and Japan in regard to Manchuria, China contracted with an American syndicate to furnish the funds to build a line traversing Manchuria north and south, and arranged with a British concern to construct the line at a fixed rate per mile. This was known as the Chinchow-Aigun Railway project. The official communications from the Russian Minister at Peking to the Waiwupu, bearing the dates of February 4th and March 4th, 1910 express in no uncertain terms Russia's position. The result of this attempt to exercise her sovereign rights within her own territory created an issue in which China's right to decide upon the course of railway construction in Manchuria and Mongolia was denied by Japan and Russia, this principle receiving the moral support of their allies, Britain and France.

In the official memorandum of M. Korostovetz, the Russian Minister, to the Waiwupu bearing the date of March 4th 1910, he proposed as an alternative scheme, the construction by foreign capitalists, of the Trans-Mongolian line, from Kalgan to Kiakhta but stipulated that the section from Kiakhta to Urga should be reserved to Russia. Conditions have materially altered in two years and now we find an independent Mongolia, recognized and protected by Russia, with the latter Power already negotiating with French financiers for the construction of railway lines within the new independent state, under a Russian guarantee as to the interest on the construction loan. In his speech before the Press Association at Peking, Dr. Sun referring to Russia's reported activity in the matter of the Kalgan Kiakhta line with French capitalists asked the question. "When this scheme is laid before us shall we agree to it or refuse it?" "On the other hand, if we at once start to prepare to construct the line ourselves, we shall be able not only to check the Russian aggression, but also to secure the same French capital for our own use." Bearing in mind Russia's attitude in the Chinchow-Aigun railway matter, and her actions of the last few months in regard to Mongolia, it seems hardly likely that China's wishes will be consulted at this time, and when Russia decides to build the line, it will be too late for China in her weak and disorganized condi ion to do more than protest. Dr. Sun's plan is to finance such lines as the Kalgan-Kiakhta by foreign capital, and he hopes to forstall Russia, by entering at once into financial negotiations to build this line, expressing the hope that the same French capital can be secured.

Dr. Sun is an optimist and has an overwhelming faith in the ultimate triumph of those principles of justice that, unfortunately have no existence in the world politics of to-day, especially where the interests of his country are concerned. That Dr. Sun can retain his trust in human altruism is eminently creditable to him as a man, but renders him liable to be mistaken in his interpretation of existing facts.

If Russia as reported, is negotiating with a financial syndicate, and especially if it be French, and stands ready to guarantee the interest on the cost of constructing railways in Mongolia, it implies that Russia has already decided to annex the territory, and will brook no interference with her plans. It also signifies that she has the firm support of France, her financial backer and ally. If Dr. Sun believes that a French political loan with the Russian government guarantee can be diverted to the uses of China, in her present financial straits and unrecognized status and employed in frustrating the uses for which it was intended, then he has failed to grasp the full significance of recent political events affecting the future of China. It may be safely assumed then, that future railway construction in North and South Manchuria, will be undertaken only by or with the consent of Russia and Japan, and China will be excluded from any participation in the development of these provinces.

The same Powers are now engaged in extending their policy of "peaceful penetration" into Inner and Outer Mongolia, and the time cannot be far distant, when notice will be served on China, that any effort on her part to restore her authority over these dependencies will be considered as an unfriendly act or words to that effect. So we may eliminate Outer Mongolia at least, as a field for the extension of Chinese railways in the immediate future.

Two or three years ago, when Russia's railway program in Central Asia was being discussed by the Duma, the Chinese

Government awoke from its slumber, and took sufficient notice to authorize the Railway Board to make a survey and report on certain lines in Mongolia to counteract the Russian menace, and then yawned and slid back into the sleep of centuries. The FAR EASTERN REVIEW at that time fully described the gravity of the situation. That was China's opportunity. She let it slip. Through it she has lost Mongolia.

Any comprehensive scheme for a national system of Chinese railways, must have for its objective the development of the country on a broad scale to facilitate transportation of crops and products to the nearest seaport for exportation. Railways must have some outlet to the sea, and open ports are essential to the development of the country and profitable operation of the railways. In the elaboration of any comprehensive railway scheme, it is natural to suppose that the Chinese government will make some provision to build up a port entirely within its own jurisdiction, and under its exclusive control. It is inconceivable to suppose that China would contract enormous loans for the furtherance of any policy tending to strengthen and enrich the foreign interests holding the keys to her interior through the possession of the best harbours on her Coast. This is a most important and vital question, and before we follow Dr. Sun's scheme any further, an elucidation of the situation involved is necessary to a better understanding of what China has to contend against. The question of the control of open ports under her own jurisdiction is of such paramount importance to China's future progress, that all railway projects must perforce be co-related to it. China has been despoiled of her most valuable deep water harbours. Dalny and Port Arthur in the North are under lease to Japan, Kiaochow to Germany, Wei-hai-wei to Britain, Shanghai is under an International Council, Hongkong has been ceded to Britain, and France holds Kwangchow Bay.

Two years ago when the scheme for constructing the Central trunk line was seriously considered by China, the question of a suitable port under her own jurisdiction, located on the eastern coast, became of prime importance to the success of the project. The little unknown port of Haichow, was selected as the only spot on the coast, which could be developed as the terminus of the line to Kaifeng and beyond. The situation then created was set forth in an article entitled "Railway Strategy in China" appearing in the June 1910 issue of The FAR EASTERN REVIEW. As conditions have not changed we reproduce herewith that part of the article which serves to illustrate our point:—

"It is a significant fact that China has been deprived of all the valuable ports situated on the northern stretch of her coast. Shanghai, the great commercial center of the Empire, is ruled by an International Council, and the Central Government has no control over its affairs. Tsingtau is held by Germany, Weihaiwei by Great Britain, Dairen and Port Arthur by Japan; this leaves to China the outlets at Newchwang, Tientsin and Chefoo. Newchwang as a port is worthless. Eighty years ago the spot on which Yinkow now stands was at the bottom of the sea, and it is now twenty miles inland from the mouth of the Liao River. The encroachment of the land on the Liao-Gulf is going on so rapidly that any port at the mouth of a river can never be depended on as a permanent outlet for trade. In addition, the Liao River at Newchwang is frozen over for at least four months of the year, and all commerce is checked until the thaw, and then only shallow draft coasting vessels can reach the town.

Chinwangtao is an artificial ice free port owned and operated by the Chinese Engineering & Mining Company. Tientsin which ought to be the great port for North China is handicapped by the same disadvantage as Newchwang, and any scheme of improvement embracing a large expenditure is only a waste of money. The silt carried down by the Haiho is so great that constant dredging is necessary to keep a channel open for light draft steamers. Large vessels have to lie off shore as far as nine to ten miles, so Tientsin as a port can never figure in any important scheme for the development of the Empire, or the advancement of a national policy.

There remains Chefoo which might be made a great Chinese port, but while the depth of water is ample, the harbour is open to the heavy northern gales, and a breakwater is imperative to make it safe for vessels during the winter season. But at the best, even after a large expenditure of money on improvement schemes, the harbour of Chefoo could only accommodate a very limited number of vessels. Chefoo's prominence as a port has rapidly declined since the opening of Tsingtau and the construction of the Shantung Railway. The trade of the province, which once flowed through Chefoo, has been diverted to Tsingtau, and the only hope of the port is the building of a railway which will terminate at some point on the existing Shantung Railway. It is quite clear that such a road might menace the prosperity of Tsingtau, and diminish the through traffic of the German line, and as it conflicts with German interests, must meet with their disapproval. Chinese promoters have several times endeavored to raise the funds to construct this line from Chefoo to Wei-hsien, but up to date have been unsuccessful. Under the terms of the Kiaochow Convention, if the Chinese desire foreign capital to develop the province, they must turn to Germany, and in view of the menace to her own interests, it is quite natural that she would withhold financial assistance to such a scheme. While the Chinese are free to apply elsewhere for aid in the event of German refusal, such action on their part would undoubtedly result in complications. At all events, Chefoo could never enter into any plan of the Chinese Government of building up a port under its own control, for as long as the Kiaochow Convention holds good, the proposed railway line will only have a local importance, and would be useless to China in the advancement of any broad national policy for the development of the Empire.

Weihaiwei, leased to Great Britain, has no future as a trade port. So it is quite clear that China is at present deprived of the only really good harbour on the Northern coast through which she could divert the great trade of the Central provinces. Japan holds the best harbours for the outlet of Manchurian trade, and Germany occupies the port of Tsingtau, commanding the desirable trade routes from the sea to the great central provinces. If foreign railway programs are permitted full scope to develop, the logical sequence is that China will be for ever barred from controlling a suitable deep water base for the furtherance of her own policy.

Some months ago, it was reported that the Chinese Government had opened the port of Haichow, a hitherto insignificant harbor on the north-eastern coast of Kiangsu Province just south of the Shantung border. This report, however, lacks official confirmation. The reason for such a step is now made clear by the imperial sanction to a scheme for building a railway from Kaifengfu, through Suchowfu, Tsingkingfu and thence to Haichow."

Since the above was written, the Yangtsze port of Pukow, has assumed considerable importance as the southern terminus of the Tientsin-Pukow Railway. The Yangtsze river is navigable for ocean steamers, and the necessary wharves and terminal facilities could be economically constructed to enable the port to handle the large import and export traffic from those sections of China not within the influence of Tsingtau. Haichow could only be developed at a large expenditure, and artificial protection would have to be provided against the heavy northerly and easterly gales. For strategic and commercial reasons therefore, it would seem that the only port open to China in the north as the outlet for any large system of state owned railways, and one that would remain under her undisputed control, is that of Pukow on the Yangtsze.

To the south of Shanghai the ports of Foochow, Amoy and Swatow remain under the jurisdiction of China. The fact that China has retained jurisdiction over these is sufficient evidence of their strategic worthlessness. These ports may serve as the terminii of local railway lines tapping the adjacent hinterland, but as far as foreign trade is concerned they will always be subsidiary to Hongkong or Shanghai. Hongkong's position commanding the approaches to Canton, coupled with her natural advantages as the only deep water port south of Shanghai gives her control of the entire trade of that part of China, and the Colonial Government has burdened itself with a large debt to insure the commercial supremacy of the port, by the construction of the Kowloon-Canton Railway at a cost of nearly £50,000 per mile. Any elaborate scheme for the construction of railways radiating from Canton, must necessarily strengthen this position. To offset these advantages China could improve the approaches to the West River, dredge the channel, and develop a deep water port of her own at Whampoa. And this must be done, unless she is willing to burden herself with a heavy debt for the glorification of Hongkong. We understand that Dr. Sun has given this phase of the problem serious consideration and his plans contemplate certain improvements that will free Canton from her dependency on Hongkong. The question then naturally arises, will the powerful British financial interests support a scheme of this nature tending to diminish their national commercial supremacy in South China? And yet a Southern port under China's jurisdiction is essential to the successful development of her railways. Otherwise the trade of Yunnan will flow out to the sea through French territory at Haiphong, and the vast commerce resulting from the proposed new trunk lines will be diverted through Britain's vantage point at Hongkong.

With the above exposition of the relation between port terminals and railways in China we may now turn once more with a clearer understanding to Dr. Sun's schemes and analyze the railway situation in the metropolitan province of Chihli. On the 10th of October, 1898, the Chinese Government entered into a loan contract with the British and Chinese Corporation Ltd, to advance £2,300,000 on the security of the then Peking-Newchwang Railway. The terms and provisions of this agreement are such that to a certain extent, it gives

British interests the right to dictate China's railway program in Chihli for a period of forty-five years. Clause 3 of this document reads:—

"*Should it be decided hereafter to construct branch lines or extensions connecting with the lines herein named, their construction shall be undertaken by the Railway Administration, and should the funds of the Railway Administration be insufficient for that purpose, it shall apply to the Corporation for the same.*"

When the management of the Northern Railways was restored to China in 1912, an additional agreement was entered into with the British authorities which amplified and defined the original contract. Article 5 of this Supplementary Agreement reads:—

"*Under Clause 3 of the Agreement dated October 10th, 1898, it is stipulated that the construction of branch lines or extensions shall be undertaken by the Northern Railway Administration, and the intent of this stipulation is hereby confirmed in order to secure the existing interests of the railways. It is therefore agreed that the construction of any new railway within a distance of eighty miles of any portion of the existing lines, for which concessions have not been signed previous to the date of this Agreement shall be undertaken by the Administrators-General of the Imperial Northern Railways.*

Such lines as the following:—

A northern line from Peking or Fengtai to the Great Wall;

A chord line from Tungchow to Kuyeh or Tongshan;

A line from Tientsin to Paoting Fu;

shall not in view of the interest of the Imperial Northern Railways be allowed to fall into other hands."

In other words these two clauses permit the Administration of the Northern Railway to construct extensions to the existing lines, out of the surplus of the Railway, but if these should be insufficient and a foreign loan becomes necessary, China is bound to apply to the British and Chinese Corporation for the funds. The Peking-Kalgan railway has since been built under these conditions, but the chord line from Peking (Tungchow) to Tangshan which would lessen the distance from the capital to the winter port of Chinwangtao and Manchuria, and the line from Paotingfu to Tientsin has never passed the paper stage. Both of these projects are approximately 90 miles long, and their construction would satisfy the railway demands of Northern Chihli for years to come.

A line from Peking or some point on the Kalgan Railway to Chengtehfu (Jehol) the capital of Inner Mongolia, a distance of about 100 miles, received serious consideration from the Manchu authorities in late years. Jehol has no trade to speak of. Its importance arises from the fact that an Imperial Palace used as a pleasure retreat for the Manchu Emperors and court is there located. With the downfall of the Manchus, Jehol loses much of its prominence. Any railway connection with this section of the country must have its outlet at some point within the sphere of influence covered by the British and Chinese Corporation agreements. China can only build these lines with her own money, and if foreign funds are required the British Corporation controls the undisputed right to advance them.

The natural outlet for Inner Mongolia (or Northern Chihli) follows the course of its rivers in an easterly direction, thus tending to direct the flow of trade into the territory served by the South Manchurian Railway. Signs are not wanting that if Mongolia becomes irretrievably lost to China, Japan is to receive as her share that part to the North of the Great Wall, comprised wi hin the provincial jurisdiction of Chihli, and known as Inner Mongolia. It is significant that Dr. Sun's Northern trunk system originates at the little open port of Chinwangtao the property of a British corporation, situated just within the Great Wall, and from there strikes northwest into the heart of Mongolia. This is undoubtedly a safer scheme at the present time than adhering to the old plan of constructing a new port at Lienshan (Hulutao) and starting a railway from Chinchow, to tap the districts of Inner Mongolia. Japan can offer no objection to such a scheme, and the British government must support a British loan for the construction of at least 80 miles of the line inland from Chinwangtao. If Dr. Sun loses no time in opening negotiations for a loan to construct a line swinging around the larger market towns of Inner Mongolia and terminating at Kalgan, he may hope for success, and consolidate for all time China's hold on this threatened section of her territory. The line may not pay its interest charges for years, and must be classed as a political or strategic road, but as the country is developed it will prove as profitable as any other line in China.

Such a line would shorten the distance by over 100 miles between Kalgan and the sea, and in connection with the enlargement of the port and terminal facilities of Chinwangtao would reduce the heavy charges on the freight and export products of Mongolia which now flows through the warehouses of Tientsin preliminary to shipment abroad. The acquisition of the port of Chinwangtao by the Chinese Government, would obviate the large expenditure on the Lienshan or Hulutao projected harbour works and insure a safe base for her northern system of railways, free from any possible political interference for years to come.

The extension of the existing Kalgan railway through Northern Chihli to Tatungfu and thence northwest to the great frontier mart of Kweihuacheng, has been surveyed and is now under construction with the funds furnished by the surplus earnings of the Northern Railway. Unless Russia recedes from her position as regards Mongolia this is the present limit of possible railway construction by China in Northern Chihli.

Just south of Chengtingfu on the Peking-Hankow trunk line, the Cheng-tai Railway branches off to the west, terminating at Taiyuanfu, the provincial capital of Shansi. This line was constructed under a loan agreement entered into in 1903 with the Russo-Chinese Bank. It was a commercial undertaking in which the Russian Government was apparently not concerned. The Russian Bank acted as the agents of the French Group or section of the Bank, who were entrusted with the construction and operation of the line. Belgian capital was also largely interested in the combination.

In the terms of the loan agreement appears a clause as follows:—

5. "*During the whole 30 years or-and while the loan is unredeemed, the high authorities of Shansi shall, at the request of the Company, interdict the construction of another railway or other mechanical means of transport between Liu-lin, Chengting and Taiyuan-fu, as such would be detrimental to the interests of this railway.*"

The Memorandum on French Railway and Mining Concessions secured by France and French Companies in China discloses that the Chengtai Railway concession contemplated the extension of the line to the southwest, implying the existence of some additional or secret understanding not specified in the agreement. These claims were subsequently brought to the notice of the Chinese Government after the completion of the line to Taiyuanfu in a despatch from the Belgian Minister, revealing the fact that Sheng Kung-pao had promised the French Company in 1904 that an extension of the line from Taiyuanfu to Sianfu and a short branch to Pingting-chow would also be constructed with their capital. The Belgian Minister desired to inform the Chinese Government that the Company was quite willing to conclude the agreement in fulfillment of that promise. As there was no official record of this arrangement on file at the Waiwupu, the matter was referred to H.E. Sheng for confirmation. And there it has rested.

There are good reasons to believe that the Belgian and French claims had some basis in fact, or they would not have been advanced. Sheng Kung-pao had full authority in railway matters at that time, and his promise was binding on the Government. Therefore as a matter of equity, if foreign funds are secured for the extension of the Chengtai Railway beyond Taiyuanfu, China is bound to apply first to the Russo-Franco-Belgo Group. The only alternative lies in constructing the line with native capital, and this way out of the tangle has found effect in the organization of a Shansi provincial concern called the Tungpu Railway Company, for the purpose of building and operating a railway from Tatungfu in the North to Puchow in the Southwest corner of the province. This line would connect with the Kalgan extension

at Tatung, with the Chengtai line at Taiyuan, and with the projected Lotung section of the Central trunk system at Tungkwan. The company has called in the first installment on its shares, and at the outbreak of the revolution was engaged in ordering rails, bridges and rolling stock. It is doubtful, however, if the province can ever raise the $20,000,000 gold necessary to construct the 450 miles of line. A section or two may be built and then the funds will peter out and an effort made to contract a loan with some syndicate other than the one having the first option. The Chengtai railway is meter guage and can have no relation to the broad guage system proposed for the rest of the country. So here we find another hard nut for Dr. Sun to crack in building lines through Shansi.

The section of China lying between the provinces of Chihli and the Yangtsze River, comprises more delicate railway questions than all the rest of the country combined and the struggle for control by antagonistic foreign interests through the exploitation of railways has been constant and bitter.

The province of Shantung in which is situated the fine town and protected harbour of Tsingtau, is the natural outlet for the trade of Southern Chihli, Honan, Shansi, Kansu and beyond. The possession of the one good harbour on the coast north of Shanghai, should make Tsingtau the great distributing center and railway terminal of North China.

But Tsingtao is leased to Germany, who has in addition prefential rights on all railway and development schemes in the province of Shantung. The agreement between China and Germany in regard to Railway and Mining concessions in Shantung contains the following clauses:—

1. The Chinese Government sanctions the construction by Germany of two lines of railway in Shantung. The first will run from Kiaochow and Tsinan-fu to the boundary of Shantung province via Wei-hsien, Tsinchow, Pashan, Tsechuen, and Suiping. The second line will connect Kiaochow with Chinchow whence an extension will be constructed to Tsinan through Laiwu-hsien. The construction of this extension shall not be begun until the first part of the line, the main line, is completed, in order to give the Chinese an opportunity of connecting this line in the most advantageous manner with their own railway system. What places the line from Tsinan-fu to the provincial boundary shall take in en route is to be determined hereafter."

"If at any time the Chinese should form schemes for the development of Shantung, for the execution of which it is necessary to obtain foreign capital, the Chinese Government, or whatever Chinese may be interested in such schemes, shall, in the first instance, apply to German capitalists. Application shall also be made to German manufacturers for the necessary machinery and materials before the manufacturers of any other Power are approached. Should German capitalists or manufacturers decline to take up the business, the Chinese shall then be at liberty to obtain money and materials from sources of other nationality than German."

The construction of the railway from Tsingtao to the provincial capital at Tsinanfu, was the direct outcome of the above concession. On its completion, Germany settled down to a fixed program to derive the full pecuniary advantages of her monopoly. The splendid harbor of Kiaochow had been converted into a first class naval station with a floating dock and repair shops, and the model German city of Tsingtau—the gem of the Orient—was laid out and built up on scientific lines. A system of covered wharves, alongside of which the largest mail steamers could warp, were constructed as freight terminals for the railway, and every energy was then expended to attract commerce to the new free port. It soon became apparent that the poverty stricken province of Shantung, would never justify in trade returns the heavy expenditures on Tsingtau, unless the railway could be extended westward to tap the richer sections of the hinterland. To all overtures for such a concession, the Chinese Government turned a deaf ear.

In 1897, a year previous to Germany's lease of Kiaochow, a Chinese merchant was granted the right to construct a railway from Tientsin to Chinkiang, and concluded a loan for this purpose with an Anglo-American syndicate in August of the following year. The acquisition by Germany of preferential rights in Shantung earlier in the same year, precluded the passage of such a line through this province, and the difficulty of finding another route caused the abandonment of the scheme. Germany finally secured the concession for building the northern half of this line, and British interests the southern section. In permitting Germany to build that portion of the line within the province of Chihli, or from Tientsin say to Tehchow, a distance of about 90 miles, the British and Chinese Corporation relinquished their rights obtained under the loan contract with the Northern Railways and allowing Germany thereby to gain an entrance into Tientsin and North China, and divert the trade of that section towards Tsinanfu and over the rails of the Shantung railway to Tsingtao. When Tientsin is closed by ice during the winter months, the export trade of North China is paralyzed, with the exception of the small volume which finds its way out of the harbor of Chinwangtao. A glance at the map will show that much of the trade now enjoyed by Tientsin, could be diverted to Tsingtao with considerable advantage to a vast section of North China, and consequent profit to Germany. The construction of any line or lines connecting the Northern or German section of the Tientsin-Pukow with the Peking-Hankow Railway, would create a revolution in the old established channels of trade, and instead of flowing northwards to Peking and then down again to Tientsin the products of Southern Chihli, Shansi, Shensi, and Honan would follow the shortest and most direct route to the sea, over the German lines to Tsingtao. German diplomacy has been keenly alive to this fact, and the German Minister has on several occasions approached the Chinese Government to secure a concession to construct a line to connect Chengtingfu with Techow and Kaifeng with Yenchow. According to Mr. P. C. Kent, in his valuable book on "Railway Enterprise in China" the German Minister has only succeeded in arriving at an understanding with the Chinese Government to the effect that in the event of the Chinese Government deciding upon the construction of these lines and requiring the assistance of foreign capital, German capitalists will be allowed the first refusal of the concession. "A glance at the map is sufficient to indicate the commercial importance of these railways to Shantung and Tsingtao." Their construction would give Germany a through rail connection to Taiyuanfu and beyond, dominating the carrying trade of Shansi, and the Yenchow-Kaifeng connection would place the Kaifeng-Honan (Pienlo) Railway and the proposed central trunk line tributary to Tsingtao and permit this port to compete with Hankow for the Yangtsze Valley trade.

With the thoroughness characterizing her foreign trade policy, Germany has carefully protected and insured her position in Shantung, and as the construction of these lines will ultimately become imperative for the development of China, she may well afford to bide her time with the calm assurance that her plans will mature. Her position is further safeguarded by the terms of the Tientsin-Pukow Loan Agreement, Clause 19 of which reads:—

19.—Branch lines in connection with the railway line mentioned in this Agreement may be built by the Imperial Chinese Government with funds at their disposal from Chinese sources, if thought advisable, and if foreign capital is required preference will be given to the Syndicate."

The above terms in connection with the understanding arrived at between the Chinese Government and the German Minister once more attests to the impregnable position of Germany. On one hand, if foreign money is used to construct these lines China must give the refusal to German financiers, and on the other, any branch lines or extensions to the Tientsin-Pukow line, must be the subject of negotiations with the German syndicate. As Baron von Bulow aptly stated, "Germany has secured in Kiaochow a strategical and political position which assures us a decisive influence on the future of the Far East. From this strong position we can look with complacency on the development of affairs. We have such a large sphere of action and such important tasks before us that we have no occasion to grudge other nations the concessions made them."

The Chinese have been endeavouring for some years to raise sufficient capital to construct a railway connecting the

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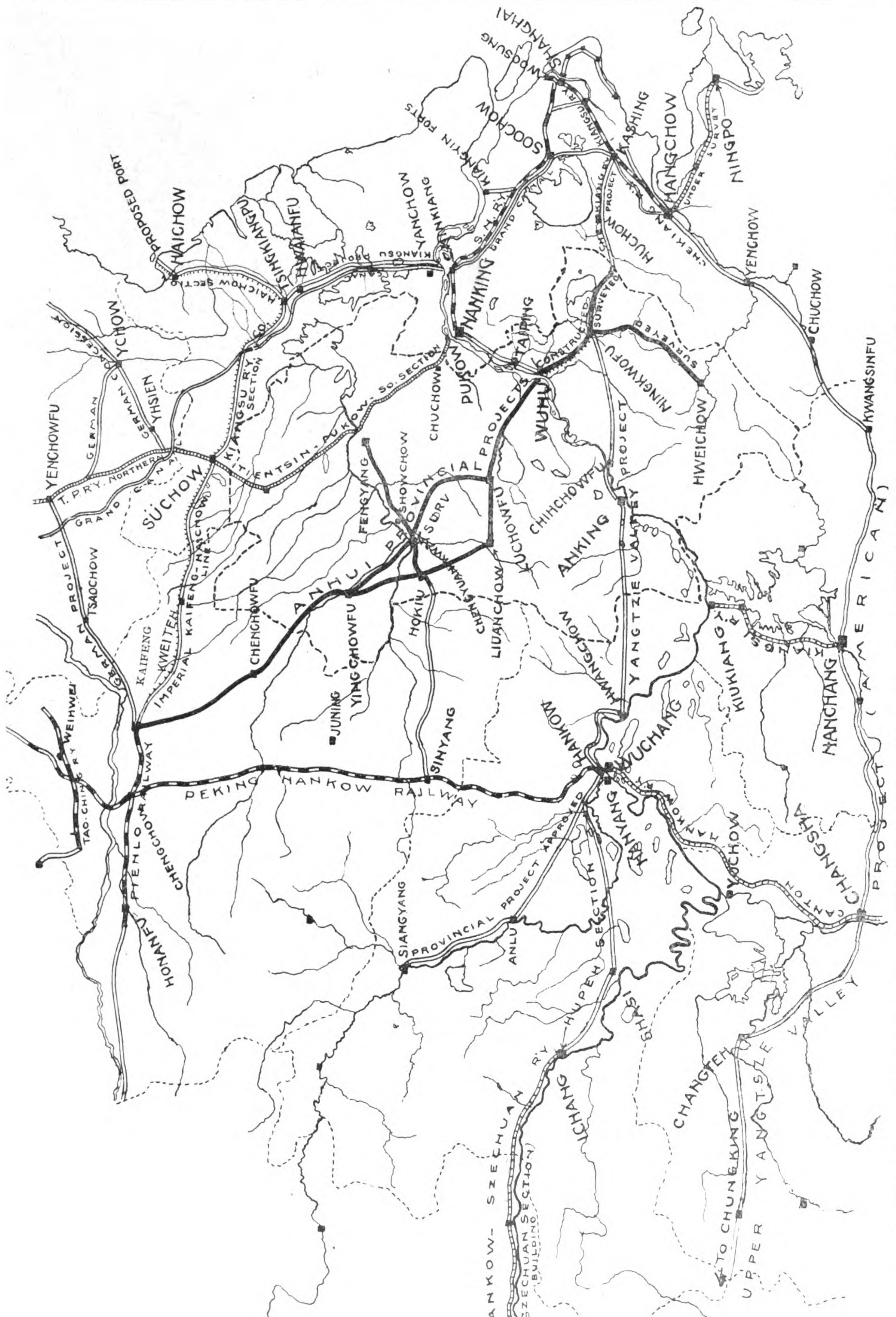
THE FAR EASTERN REVIEW'S SKETCH MAP OF RAILWAYS IN CENTRAL CHINA, SHOWING THE KAIFENG-HAICHOW SCHEME

The line of the proposed Kaifengfu-Haichow railway is traced in black, except that portion between Suchowfu and Tsingkiangfu, which is to be constructed by the Kiangsu Railway Co., a Chinese concern. The German sphere of influence in Shantung Province is shaded. The project of the Chinese Government, as outlined on the map, clearly shows its great political importance and bearing on the ambitions of Germany, and the prospects of the British lines, and also its relation to the great Trans-Asiatic trunk line approved by China. The Peking Syndicate railway claims to an outlet from the mines to the Tientsin-Pukow railway are practically nullified by the new Chinese scheme. The German project to link the Tientsin-Pukow line with Kaifeng via Tsaochowfu is also without value in view of the new road. It will be noted also that Haichow stands in the same relation to the Yangtsze River junk traffic, as does the great port of Shanghai, and much of this can be diverted through the Grand Canal to Tsingkiangfu and through the Yen River or over the new railroad to the new Port of Haichow. (The above map was published prior to the signing of the Hukuang Loan Agreement, and fails to show the German section of this line.)



MAP ILLUSTRATING RAILWAYS IN CENTRAL CHINA WITH SPECIAL REFERENCE TO THE PROJECTS OF THE ANHUI PROVINCIAL RAILWAY COMPANY, WHICH ARE SHOWN IN BLACK LINES

port of Chefoo with the town of Weihsien on the line of the Shantung Railway, a distance of about 170 miles. Before the construction of the German railway and rise of Tsingtao, the treaty port of Chefoo controlled the commerce of the province. This has since been gradually diverted to Tsingtao and year by year sees the commercial importance of Chefoo as a port diminishing. The merchants of Chefoo believe that a Chinese owned railway tapping the German line at Weihsien would restore the fortunes of the port, by attracting trade to that outlet. A glance at the map will show that this hope is a vain one, and such a line would only be of local importance and exert influence over a very small territory. Instead of a commercial blessing, it might prove otherwise, for the German line by a legitimate exercise of discriminating rates for through shipments to Tsingtao could attract considerable trade that now flows out through Chefoo. The Chinese accuse the Germans of obstructing and opposing their efforts to construct this line for the restoration of Chefoo's prosperity. They may have good grounds for the accusation. On the other hand, it would not make a particle of difference in the situation, for as long as Germany controls the Shantung railway, through shipments from the interior destined for export or *vice versa* must be carried over its rails, and during the life of the 99 year lease, there is no way to circumvent or evade her control over freight rates in Shantung. The Chinese may ultimately construct the Chefoo-Weihsien railway, but there the matter ends. It is a purely local affair subsidiary to and dependent upon the German line for such trade crumbs as it may feel disposed to throw its way. This line might ultimately prove a profitable undertaking from the passenger receipts.

There is just one avenue open that China might follow in order to liberate her Northern commerce from passing over the German rails to Tsingtao. Instead of constructing a railway from Chefoo to Weihsien, the line could follow the coast, skirting Laichow Bay, striking westwards through Pinchow and Wutingfu to Tehchow connecting there with the Tientsin-Pukow line and the projected connection with the Peking-Hankow line at Chengtingfu, making possible a through Chinese trunk line from a Chinese port to Shansi, Northern Chihli and beyond. With several millions expended on port works, breakwater and other improvements at Chefoo independent of the railway, and about $13,000,000 gold more to construct the 320 miles to Tehchow and another $4,500,000 for the 110 mile connection to Chentingfu, with a possible $3,000,000 gold for a bridge over the lower reach of the Yellow River, or a rough total of $25,000,000 gold, China could control her own northern port and revive the prosperity of Chefoo. By lower freight rates, discrimination against the German line and a patriotic campaign to patronize a national railway such a scheme if possible of realization would be profitable, provided, however, that Chinese patriotism rises to the heights of subscribing the entire capital from within the country. If they fail, and seek foreign assistance, the Germans must be first consulted. A loan for $25,000,000 or even half that amount, to be employed in opposition to the national programme, would never receive consideration from any German syndicate.

It may be taken then for granted that there is no scope for the expansion of a purely Chinese national railway policy in Shantung, or those regions tributary thereto embraced under the loan agreements and understandings arrived at between Germany and China, so we may therefore eliminate Shantung from any place in such a scheme, until such time as Germany is willing to forego or relinquish some of her advantages.

The region to the immediate south of Shantung in North Kiangsu and Honan and westwards in Shansi and Shensi along the Yellow River valley, embraced in the territory tributary to Chinese projected central trunk line, contains some interesting railway puzzles to work out. In the northern horn of Honan province, is found the Tao-Ching Railway, built under the terms of a mining concession granted by the Chinese Government to the Pekin Syndicate in 1898. Clause 17 of this concession is as follows:—

"*Whenever it may be necessary for any mine to make roads, build bridges, open or deepen rivers or canals, or construct branch railways to connect with main lines or with water navigation to facilitate transport of Shansi coal, iron and all other mineral products from the province, the Syndicate on reporting to the Government of Shansi is authorized to proceed with the works, using its own capital without asking for Government funds.*"

This clause has been interpreted by the Corporation as conceding not only the right to construct a railway from the mines in Honan, to an outlet at Taokow on the Wei River, but also the right to a line from the mines to the nearest deep water navigation on the Yangtsze River. The first line was accordingly built, having a length of 96 miles. A survey southwards through Honanfu, to Siangyangfu on the Han river was made, but this was subsequently abandoned in favor of a line across the country to Pukow, on the Yangtsze, a distance of 350 miles. And this interpretation of the clause, was recognized by the Chinese Government. As compensation for the slight to British interests in ceding the Peking-Hankow concession to Belgium, the Chinese Government in 1898 granted the British and Chinese Corporation the rights to a railway commencing at Sinyang, a town on the Peking-Hankow Line, and terminating at Pukow on the Yangtsze. Later on, the same corporation received the concession for the southern section of the Tientsin line terminating also at Pukow. The conflicting situation so created was subsequently solved by a combination of the above mentioned syndicates under the name of the Central Chinese Railways, Limited for equal participation in all future railway development north of the Yangtsze.

The Sinyang-Pukow line is still on paper, and in time may be constructed. The Tientsin-Pukow line is completed. If the former concession is carried out, then the claims of the Peking Syndicate find expression in the rights covering a railway from the mines to some point on the British section of the Tientsin-Pukow Railway line north of Pukow. A glance at the map will disclose that these claims if allowed, will nullify the advantages of the proposed Chinese central trunk system. The point is, that the claims exist, and are recognized by the Chinese and British Governments, and cannot be set aside without compensation. In addition to these recognized claims it appears that the Chinese Government entered into certain contracts with other British interests dated 5th November 1899 and 3rd June 1902 in connection with the construction of embankments for waterways and railways in the Yangtsze and Yellow River Valleys. These contracts are held as binding on the Chinese Government, but the British Foreign Office has refused to recognize their validity or protect the interests of the holders. It appears that these contracts conflict with rights afterwards ceded to the recognized British syndicates and the refusal of Sir Edward Grey to intervene in favour of the superseded interests has provoked many bitter and adverse criticisms of his policy. We are not familiar with the specific details of the above contracts and their exact bearing on projected railways in the section of China under discussion. But the claims exist and undoubtedly will again be advanced for recognition whenever an opportune moment presents.

Just south of the Yellow river we find the Pienlo Railway in operation from Kaifengfu to Honanfu built under a loan agreement with a Belgian syndicate. This short road connecting the two important cities of Honan is the first expression of the much talked of Central Trunk line which will proceed westwards via Tungkwan, Sianfu, Lanchowfu and across Chinese Turkestan to the frontier cities of Kashgar and Ili. The first section westwards from Honanfu (Loyang) to Tungkwan is known as the Lotung Railway. From Kaifengfu eastwards the projected trunk line is known as the Kaifeng-Haichow Railway.

The Belgian Loan Agreement under which the existing section from Kaifeng to Honan (Pienlo) was constructed contains a clause as follows:—

Article 23.—Should the Compagnie Générale de Chemins de Fer et de Tramways en Chine finish satisfactorily the work for the railway from Kai-feng Fu to Ho-nan Fu, complying strictly with all the provisions of the present contract, and should the Chinese Government decide to extend the railway from Ho-nan Fu to Si-ngan Fu, the Director-General of the Imperial Chinese Railway Company agrees to come to an understanding preferably with, and to grant an option for the loan necessary for said

undertaking to, the Compagnie Générale de Chemins de Fer et de Tramways en Chine in conformity with the provisions and conditions of the present contract.

This undoubtedly gives the Belgian syndicate the first option on furnishing the funds not only for the Lotung section, but also as far as Sianfu, the provincial capital of Shensi, a distance of about 210 miles, necessitating an approximate expenditure of $10,000,000 gold. On the completion of the line however instead of applying to the Belgian syndicate for a further loan to construct the extension to Tungkwan and Sianfu, the Chinese in their desire to dispense with foreign aid, determined to continue the work with their own funds. The people of the province organized a society styled the Honan Railway Investigation Company, with a capital of $15,000,000 with shares at $5 each. Their "investigation" included the construction of a line connecting Kaifeng with Tsinanfu via Yenchow, thus playing into Germany's hands. Warned away from this project by Peking, they investigated a line eastwards towards Suchow to connect there with a local line, and then after a lapse of three years they finally got down to business and decided on taking up the extension to Tungkwan, and reorganized the company as the Lo-Tung Railway Co. The amount raised by popular subscription was however insufficient to commence serious work although the market was flooded with inquiries for construction material. A loan was necessary. Did the Honan gentry turn to the Belgian syndicate in compliance with the contract of the Central Government?

Not they. They tried everywhere else, and finally realizing the impossibility of securing a foreign loan on their own terms, they made a contract with the Kung-i Bank for a 6.8 per cent Tls. 5,000,000 loan, which this bank having a paid up capital of only Tls. 200,000 tried in turn to negotiate with foreign syndicates. Up to the outbreak of the revolution the Lotung Railway Company had exhausted about every possible expedient to borrow money from everyone except the Belgian syndicate who undoubtedly stands ready to comply with the clause of the Kaifeng-Honan Contract giving them the first option. The extension of the section to Sianfu the capital of Shensi Province has failed so far to elicit any interest on the part of the Provincial gentry, and no funds have been raised for the purpose. The people of Honan who have contributed to the Lotung Company, have some equity which has to be considered in any future scheme, and it would appear that the Belgian syndicate's claim to finance the line in case foreign money is needed is indisputable.

It will be remembered that the Chengtai railway concession negotiated with China by a *Russian* Bank, was constructed by a *French* company, and the alleged rights to finance its extension towards Sianfu was advanced at Peking by the *Belgian* Minister, thus confirming the close community of interests existing between these three Powers for the advancement of a railway program in China. The rights to finance a line to Sianfu, from either direction therefore undeniably rest with this combination, and it is doubtful whether the three Powers concerned will entertain any alternative proposition tending to deprive their nationals of these acquired rights.

The construction of the central trunk line beyond Sianfu as far as Lanchow the capital of Kansu Province, a distance of some 350 miles, will necessitate another $17,500,C00 gold investment. While no one Power has acquired special railway rights in Kansu Province, Belgian influence is already very strong; the Mining adviser to the Provincial government is a Belgian.

From Kaifeng to Sianfu or perhaps to Lanchow, the construction of the central trunk line has some promise of being a profitable commercial venture, repaying within reasonable time the interest on its cost. From Lanchow westwards through the desert sands 1,600 miles to Ili, or 1,800 miles to Kashgar a railway must be financed under government guarantee as to principal and interest. The line would be purely political and cost approximately $90,000,000 gold.

Does the importance of Chinese Turkestan, or Sinkiang justify the expenditure at this time of $90,000,000 gold to solidify and maintain China's authority, without taking into consideration the certain annual guaranteed interest charge of at least $5,000,000 gold that will have to be provided until such time as the 1,800 mile desert railway pays a profit?

It must not be overlooked that fourteen years ago, Russia included the construction of this line, in the projected continuation of her own Central Asian schemes. If the construction by China of a little railway in Manchuria is prohibited by Russia on the grounds of menacing her strategic position on the Amur, is it likely that she would willingly consent to the construction of a line into far distant Sinkiang where her influence is now supreme and her interests are far greater and of more vital importance? If the projected Chinchow-Aigun Railway is considered prejudicial to Russia's strategic position in that section, because of the possibility of its falling into Japanese hands in case of war, would not China's projected line to Ilifu and Kashgar, be a far greater menace if they fell into the hands of another foe at some critical time in the future, thus exposing Russia's Central Asian strongholds to a flank attack.

China would probably be permitted to finance and construct a railway into Sinkiang, but only under some well defined agreement with Russia. The same applies to any Chinese line through Tibet where British influence must always remain supreme while India holds the key to the Empire.

Apart from the prohibitory clause of the Tibetan Convention, the construction of any Chinese railway through Tibet terminating at Kashgar would be viewed with the deepest concern by the British Government, and if China should at any time in the future secure the funds from other interests and persist in applying them for its construction, Russia's precedent in Manchuria would assuredly be followed by Britain, to safeguard her position in India. It is hardly probable that such a situation would ever arise, on the other hand a turn of world politics may again see Russia extending her Central Asian outposts and again knocking at the gates of India, while her financial allies and backers are making her path easier by financing a Chinese line through Tibet which ultimately might be connected at Kashgar with Russia's Central Asian system, facilitating her approach to the Himalayan passes which now act as a formidable natural barrier to any northern foe.

Russia's strategic railways throughout Asia exhibit an absolute continuity of policy, for though construction may be suspended from time to time, the main scheme is always kept in view and followed out slowly but surely. A glance at the map will conclusively prove that these lines which now appear to be enmeshing China's border dependencies are also gradually reaching out with a fixity of purpose that will once more place Russia in a position to assume an aggressive policy towards India, from the point where she left off thirty years ago. The present British Government may have compounded its differences with Russia and reached some understanding concerning future movements in central Asia, but it is only necessary to study the map and follow Russia's enormous expenditures in what she now terms commercial railways to be convinced that her schemes can only have one ultimate purpose.

It is clearly apparent then that apart from the financial and engineering features of the Lanchowfu-Ilifu-Kashgar sections of China's proposed Central trunk line, there are weighty political difficulties involved, which almost preclude any possibility of its becoming a reality in the near future. This applies with even more force to Dr. Sun's project of Tibetan trunk lines terminating at Kashgar.

Having followed the proposed central trunk line to its logical far westward terminus we may retrace our steps to the starting point at Kaifengfu, and turning eastward study the vagaries of the project in its endeavor to find a way to a deep water outlet under China's exclusive jurisdiction, without clashing with those rights already surrendered to foreign or native provincial interests.

It has been previously demonstrated that the logical outlet of such a line is northeastwards, through Tsaochow to Yenchow uniting with the existing lines terminating at the port of Tsingtao. It has also been indicated that Germany is keenly observant to the advantage such a line would confer on Tsingtao, and has secured a promise from the Chinese Government that if foreign funds are required, Germany will have the first option

to supply them. With this route closed, there would appear to be no alternative other than a line to some deep water port on the Yangtsze, and the logical point in this direction is Pukow. We find, however, that the project would almost parallel the rights surrendered to the Peking Syndicate, and capitalized by them in the organization of the Chinese Central Railways, Ltd., and as we will see later on, it also clashes with the plans of the provincial Anhui Railway Company. The trunk line, debarred from striking northwards without crossing the boundary of Shantung and entering Germany's sphere, and with all natural outlets closed, the Chinese Government determined to build due east from Kaifeng, skirting the southern Shantung boundary to Kweiteh, thence to Suchowfu, crossing the British Section of the Tientsin-Pukow line at this point, and southeast to Tsingkiangpu on the Grand Canal. The rights to this last section from Suchowfu to Tsingkiangpu had been ceded by the Central Government, and included in the plans of a local concern styled the Kiangsu Railway Company. Capital had been raised and a few miles of rails laid down out from Tsingkiangpu, when further progress was abandoned for lack of funds. The company's plans included the construction of a through line from this point along the Grand Canal to the port of Yanchow on the Yangtsze opposite Chinkiang. The Central Government decided to appropriate the Suchowfu-Tsingkiangpu section of the Kiangsu Railway Company for the central trunk line, and from the latter point follow the Yen River northwards to Haichow, and there develop a harbor behind a small island off Yuchow Promontory. This project was then known as the Kaifeng Haichow line and two years ago tentative overtures were made to foreign financial syndicates to advance funds for its construction, but serious negotiations were never opened. The Vice-President of the then Board of Communications H.E. Shen Yun-pei, claimed Haichow as his ancestral home, where he controlled large interests in the adjacent districts. This may help explain the government's enthusiasm at that time, and throw a side light on their selection of this unprotected and little known port as the terminus of the projected central trunk line. A deep water port at Haichow under the lea of the small islet off the Yuchow point, might be built up in time, but only at an enormous expenditure, and it is doubtful then whether it would ever be popular with shipping interests. Dr. Sun's scheme contemplates the selection of some point on the Yangtsze as the terminal of the central trunk system, but the exact point has not yet been officially disclosed. Pukow is generally admitted to be the most favored location, though Yangkow opposite to Chinkiang, the terminus of the projected Kiangsu Railway company's line, has the same water advantage. If Pukow, should be selected, the British section of the Tientsin-Pukow line would become the most important section of the through system.

As an indication of the working of the Chinese mind, we reproduce an item appearing in the *North-China Daily News* of 16th September, or about the time that Dr. Sun departed from Peking to commence active work on his great scheme. "Hsu-chou-Tungchou Railway.—The Directors of the Kiangsu Railway Company have obtained a loan of Tls. 45 000,000 from a French Syndicate, reports the *Shenpao* of yesterday. The loan is contracted by the Company as a private concern, and is to be repaid also by the Company privately. The money is to be devoted to the construction of the railway between Hsuchou and Tungchou, of which Mr. Li Jen-tsai has been appointed Manager. The work of construction will begin two months after receipt of the money."

This probably has no connection with Dr. Sun's scheme, and the negotiations with a French syndicate may have no foundation in fact, and they assuredly lack Dr. Sun's sanction. The item nevertheless provides food for serious thought. If true, it is conclusive evidence that the provincial railway company does not intend to have its line set aside, or incorporated in any general scheme under control of the Central authorities, and to forstall Dr. Sun, it has turned to the one financial group disposed to consider an overture for a loan. British railways in China, are practically a monopoly of the British & Chinese Corporation, and their interest centers in having the trunk line terminate at Pukow, utilizing their section of the Tientsin-Pukow Railway as the outlet. A Belgian syndicate financed the Kaifeng-Honan (Pienlo) section of the trunk line, and holds the option on the extension to Sianfu. It does not appear that they have any option to finance the extension eastwards towards Suchowfu. It is therefore significant that the Kiangsu Company would hasten to negotiate with a French (Belgian) syndicate to finance the line from Suchowfu to Tungchow at the mouth of the Yangtsze, thus permitting the Franco-Belgo-Russo allied interests to dominate the future control of the entire system. The rights of the Kiangsu Railway Company within the provincial limits of Kiangsu, entitle them to construct a line 50 miles beyond Suchowfu towards Kaifeng. This leaves a stretch of 120 miles from the Kiangsu provincial border to Kaifeng in Honan, which at present come within the "investigations" of the Honan authorities. It is apparent then that if a French syndicate concludes a loan at this juncture with the Kiangsu Railway Co., it would firmly establish their control over the entire central trunk line from the Yangtsze to Sianfu, and beyond to Lanchow, here Russian political influence would step in, and the line to Ili and Kashgar come under her influence, thus establishing a through Central Asian line under control of the three allies. The immense political bearing this control might exercise in Far Eastern affairs can be better appreciated by a study of the map. At Sianfu, the same combination has acquired the right to finance that section of the Tung-pu Railway through Shansi to Taiyuanfu, and the future project connecting Sianfu with Chengtu, also comes within their influence. Here if French plans carry through, a connection will be made in the future with their Yunnan railway. All of which tends to illuminate the absolute continuity of policy characterizing Russian railway schemes in Central Asia. The above exposition of conditions surrounding the construction of the central trunk line, make clear a few of the delicate points to be solved before the conflicting elements can be merged into a harmonious whole, and if foreign funds must be secured for the scheme, it will tax the diplomatic skill of Dr. Sun and his advisers to avoid surrendering its control to the Franco-Russo-Belgo-group.

(To be continued)

CHINA AND HER DEPENDENCIES

When the Powers decide to recognise the Republican Government of China will that Government have ceased to enjoy proprietary rights over its immense dependencies, Mongolia, Manchuria, and Tibet? That is the question that is now being asked by everyone who takes an interest in Far Eastern affairs, and the answers vary in accordance with the prejudices, hopes and preconceptions of those who are daring enough to express their views. The importance of the matter can be partially gauged by a consideration of the extent of the territory involved. The eighteen provinces of China Proper contain an area of about 1,500,000 square miles. The area of the dependencies is over 2,500,000 square miles. Should these dependencies elude China's slackening grasp, out of every 400 square miles of the former Empire 250 will have been lost.

Before the revolution Manchuria was acknowledged by treaty to be an integral part of the Chinese Empire, though the special interests of Russia in the North and Japan in the South were tacitly recognized. Mongolia was admittedly a portion of the Imperial dominions and negotiations in connection with this region had always been conducted with the Peking Government. In other words the sovereignty of China over Mongolia was acknowledged, and especially by the Power principally interested—Russia. The position in Tibet was a little different. Here the Chinese Government exercised suzerainty, but not sovereignty. An endeavour to assert sovereignty had been made, however, with some success. The Dalai Lama had been driven to India and China had seized the machinery of government.

With the success of the Republican arms in China proper an entirely new situation was created. In Manchuria outwardly things remained much the

same, but Mongolia declared its independence of China. It is claimed with apparent justification, that Russia has, at least informally, countenanced this action on the part of the former dependency. The Hutukhtu, the "Living Buddha," has become the ruler of the new state. Tibet was also encouraged to endeavour to regain her independence, and she succeeded in expelling most of the Chinese troops who had held the country in subjection since the flight of the Dalai Lama.

That there was very real danger of her dependencies being lost to her was recognised by the Peking Government, but internal chaos and lack of funds prevented any systematic measures being taken to preserve her ancient rights. However, endeavours were made by moral suasion to induce Mongolia to come into the Republican fold. Mongolia refused to listen to the voice of the charmer, and began to arm to resist any attempt on the part of the Republic to effect by force a result that could not be achieved by persuasion. Munitions, training and advice are said to have been lent to the new state by Russia, and it is also declared that a brisk trade in arms has been carried on by enterprising Japanese from Manchuria. At the present moment hostilities are proceeding in Mongolia, though necessarily with two unrecognised governments in conflict no formal declaration of war has been made.

The expulsion of the Chinese troops from Tibet, encouraged the Dalai Lama to start on his return to Lhassa. But a popular agitation in Szechuan for the despatch of an expeditionary force to reassert Chinese authority in Tibet had resulted in a force, led by the Tutuh in person, starting for Lhassa. These Chinese troops have had several encounters with the Tibetans near the frontier, but reports are conflicting in regard to the measure of success achieved. The despatch of this force however, was sufficient to make the Dalai Lama doubtful and he paused on the journey to his capital to give the matter further thought.

In the meantime an event had taken place which is generally considered to have had an important bearing on the future of China's dependencies. Prince Katsura and Baron Goto journeyed to St. Petersburg and there had important discussions with the Russian Prime Minister and the Minister for Foreign Affairs. These conversation were curtailed by the death of the late Emperor of Japan, but it is believed that an agreement was arrived at in regard to the interests of Russia and Japan in the northern dependencies of China that was highly satisfactory to both. There seems, also, to be some ground for the belief that Great Britian and France, as allies of Japan and Russia, were kept fully informed of what was transpiring, and some surmise that they gave their assent to the understanding that was eventually reached.

A diplomatic bombshell was exploded at the feet of the Peking Government in the middle of August when the British Minister presented a memorandum in which Great Britain demanded a return to the *status quo* in Tibet as established by the Anglo-Chinese Convention of 1906. The British interpretation of that Convention was that it gave no power to China to administer the internal affairs of Tibet, ~~nor to~~ despatch a military expedition thither. China was recommended to confine her activities within these bounds and to prepare to negotiate a new convention with Great Britain, otherwise the Republican Government would not be recognised. China is said to have replied stating that, as Tibet is Chinese territory, she considers it her duty to preserve the peace of the country, and it was with this in view that she had despatched a military expedition. She was agreeable to revert to the *status quo* and to withdraw the Szechuan expedition.

This is a hastly executed sketch of the situation as it existed early in September. The action of Great Britain is generally interpreted to mean that she has associated herself with Russia and Japan in the policy of weakening China's hold on her dependencies. If Russian influence becomes paramount in Mongolia and Turkestan, as seems inevitable, the interests of India would demand the establishment of Tibet as a buffer state. British policy in the Far East is governed by the necessities of India and it is thought that the British Government concluded that India's interest would be best served by establishing another Afghanistan between her and Russia. The alliance with Japan and the strong friendship with Russia, which are invaluable to Great Britain in view of possible European complications, prevented her, even if she so desired, from raising any objection to the understanding with regard to China's northern dependencies. Policy dictating her abstention from an appearance in the role of defender of that ancient shibboleth "the integrity of China," she was driven to join forces with those who see their opportunity in China's weakness. This represents the view taken by the average unprejudiced observer, Chinese or foreign. He believes that Russia, anxious to secure freedom to build the long talked of Kiaktha-Urga-Kalgan railway, encouraged the Mongols to proclaim their independence with the ultimate object of establishing herself as the paramount power in Mongolia. Japan was induced to regard this scheme without disapproval by the admission by Russia that Inner Mongolia fell within her sphere of influence. Great Britain, being unable to protest in view of her alliance and friendship, took the step that seemed most likely to protect the interests of India and announced herself as the supporter of Tibet's demand for virtual independence.

Assuming that this is a fairly correct interpretion of the motives that have been animating Russia, Japan and Great Britain, the question arises is anything likely to be done by any other Power to prevent the logical outcome of the policy of these three nations? France, who is closely watching Yunnan's tentative movements towards independence with interested eyes, is not likely to raise any protest. The only other Powers that need be considered are the United States and Germany. The United States has always been a sincere advocate of the Open Door in China and of the preservation of the country's territorial integrity. The late Mr. John Hay, when Secretary of State, blocked the establishment of spheres of influence in China and the present Secretary, Mr. Philander C. Knox, recently secured the adherence of Germany to a re-affirmation of the policy of the open door. But, can the United States afford to rebuke Great Britain and Russia for their policy in regard to Tibet and Mongolia? The world has not forgotten the circumstances that surrounded the acquirement by the United States of the Panama Canal Zone. Negotiations had been carried on with the Republic of Columbia for the acquirement of the strip of territory required without success. Suddenly, at a singularly opportune moment as far as the United States was concerned, the Columbian province of Panama declared its independence. The Government of the United States promptly recognised the Republic of Panama, took it under its protection and obtained from it the cession of the Canal Zone. With these facts on record it is difficult to see with what justification the United States could object to the Russian procedure in regard to Mongolia or to Great Britain's action in supporting Tibet. Germany it may be assumed is not likely to constitute herself the champion of China. Unless, therefore China can herself by diplomatic means, military methods being obviously out of the question, safeguard her rights there seems little possibility that she will retain possession of her dependencies.

With politics the FAR EASTERN REVIEW does not concern itself except in so far as they concern finance, industry and commerce, but the preservation of the open door is a matter of the very first importance to the interests this paper serves, and it is therefore legitimately anxious to see that no political changes vitiate the principle of equal opportunity to all. If China cannot prevent the loss of her outlying territories there should be a clear and unequivocal announcement on the part of the Powers who propose to take upon themselves China's responsibilities in the dependencies that the door shall be kept wide open and hooked back so that the traders of all nations may have free access and equal opportunity.

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THE CHINA LOAN SITUATION

An interesting situation was reached on August 30th last in connection with China's efforts to overcome her financial distress, when the final agreement for a loan of £10,000,000 was signed in London by the Chinese Minister. This loan has been in course of negotiation for some time past, and in view of the attitude of the six great Powers in committing themselves to support none but the banks connected with the Sextuple Group of bankers, every effort was made to preserve secrecy in order to obviate obstruction. By the time of the signature of the final agreement the Chinese Government was assured that the loan would actually materialise, and there was considerable jubilation (which however proved short-lived) in official circles in Peking owing to the belief that at last the Government would be able to dispense with the services of the Sextuple Group and find a free field elsewhere in which to seek for the financial aid so sadly needed.

To understand and appreciate the motives for such a desire it is necessary to trace briefly the efforts of the Government to secure finances from the time when the International Group, then composed of banks representing Great Britian, America, Germany and France, broke off negotiations owing to the duplicity practised by the Government in floating what is known as the Belgian loan, which far reaching and misguided action was fully described in the April issue of the FAR EASTERN REVIEW. When negotiations were resumed after that escapade the Chinese Government expressed its willingness to discontinue negotiations with the Belgian Group, which had advanced £1,000,000, and to negotiate with the International Group for a large loan, preliminary advances to be made in the meantime to enable the Government to pay its soldiers and provide for essential administrative disbursements. On May 17, therefore an agreement was come to by the Group with the then Minister of Finance, Mr. Hsiung Hsi-ling for an advance of Tls. 3,000,000, half to be used in Shanghai and Nanking and half in Peking, the amount to be treated in the agreement with a sum of Tls. 2,000,000 advanced by the bankers on February 28, and Tls. 1,100,000 advanced early in March before the rupture of negotiations in the latter part of that month. The Agreement covering these preliminary advances comprised a letter from the bankers and certain regulations mutually agreed upon by the bankers and the then Minister of Finance. The advances were to be delivered against the issue of Treasury bills bearing the same date, and secured by the revenue of the salt gabelle, and were to be redeemable from the proposed reorganisation loan. The expenditure of the funds comprised in these advances, (this was the first point upon which the ultimate deadlock hinged) was to be under the inspection of a foreign and a Chinese auditor, and therefrom arose the wild agitation against the introduction of foreign "supervision" of China's finances. It is necessary to explain this because of the stress laid by the Chinese upon the term "supervision." As a fact the alleged supervision amounted to no more than the appointment of a foreign and a Chinese auditor, and a staff to work with them apart from the Minister of Finance, the duty of the auditors being to sign all orders on the bankers for funds. In addition, the Ministry of Finance engaged to furnish the bankers with specific statements of the objects upon which funds obtained from the advances account were to be expended, the statement to first have the approval of the National Council and be published in the Official Gazette. In so far as the disbandment of troops was concerned the Bankers also made stipulations which were vigorously contested. They had evidence that various provinces claimed troops far in excess of the number actually in service as soldiers, and they endeavoured to arrange to avoid fraud, that the disbandment should be carried out by foreign and high Chinese military officers. This added fuel to the fire of opposition caused by the suggestion of a foreign auditor, and the local Commissioner of Customs and a Chinese official were ultimately agreed to as sufficient to satisfy the needs of the moment. But these stipulations for "supervision" placed a weapon in the hands of the opponents of President Yuan Shih-kai of which they took immediate advantage and wielded to such good purpose that the Peking Government was compelled to listen to the clamors coming from the provinces against foreign loans, and do its utmost to overcome the reluctance of the bankers to lend money without "supervision." The Government found the Bankers unable to reduce their terms, and the difficulties that confronted them from prolonged impecuniosity persuaded them to accept the terms, at least for the preliminary advances. The pleadings of the Government induced the Group to modify the demand as to the supervision of the disbandment by military officers, but the bankers would not forego the appointment of auditors. The scruples of the officials in that regard were therefore suppressed and an auditing branch having been established further preliminary advances were made on June 12 and June 18, a sum of Tls. 3,000,000 being paid over in each case, making a total of Tls. 12,100,000 in all.

Meantime efforts were being made to obtain a large loan for reorganization purposes from the Bankers upon modified terms, but the bankers plainly intimated that whilst they were prepared to lend money they could not see their way to do so unless upon the same terms already offered,—auditing of expenditure and reform the salt gabelle. On June 15 the Premier, Mr. Tang Shao-yi left the

Capital and abandoned his portfolio, and about this period the Group of four was enlarged by the entrance of banks representing Russia and Japan, the entree being the result of the bankers, conference held in Paris. On Ju e 24 the bankers waited upon the Premier, Mr. Liu Cheng-hsiang and notified him that the Group had been extended and that the only conditions upon which they would be able to lend the large amount required by China was upon the latter undertaking radically to reform the Salt Gabelle, (the revenue of which was offered by the Government as security) and place it under European management as was the case with the Maritime Customs. The Government objecte l and an interruption occurred in the negotiations which seemed to suggest to the Foreign Ministers that the situation might be relieved by a visit from them to the Premier, and consequently they waited upon Mr. Liu and the Minister of Finance, Mr. Hsiung. They made it plain that they had been instructed that their respective Governments would sanction no loan except under the terms which the Sextuple Group had already made known, and gave reasons why China could not expect anything else. The interview terminated after Mr. Hsiung had presented his ideas as to the reform of the Salt Gabelle, quoted below, and after he had again pronounced the terms to be impossible. Though agitators continue l to endeavour to raise sufficient money for Governmental purpose by a Patriotic loan, the scheme ultimately failed. The Government continued frequently to express its need of money, and repeated the demand for £10,000,000 immediately and advances of Tls. 6,000,000 per month until October, and at that period another £10,000,000 to absorb the previous advances, again proffering the revenue of the unsupervised Salt Gabelle as security. The Group declined, adhering to their previously stated terms. The deadlock thus created lasted some time, when the Minister of Finance sent an ultimatum to the Group in which he stated that he had waited for a reply to the proposition mentioned above and had not received it, and that if the Group would not lend money the Government would feel itself free to go elsewhere for the funds it needed. The reply of the Group was, naturally, that they were quite willing to lend money to China but only upon the terms previously submitted, and this evoked a further declaration from the Minister of Finance that they were impossible. He, however, expressed the hope that another conference would be held to see if a basis for agreement could not be reached, but at the same time reserved the right to go elsewhere in an effort to raise the loans required.

The Chinese agitators naturally enough used the argument to further their own political ends, that the Group was refusing to lend money upon reasonable terms, and by their agitation embarrassed the President to such an extent that at one time it looked as if he could no longer retain his position much less hold the country together. However, the political parties defeated their own object and finding the Patriotic Loan a fiasco withdrew their oppositions after a time and subsided. The Government meantime had been listening to the subtle declarations and seductive overtures of several loan negotiators and had given the provinces permission to borrow for themselves. As a result of the latter there was an unavailing scramble for money. Those who have previously talked in millions could not, when put to the point, raise thousands nor even hundreds, and quickly it was found that grave difficulties really stood in the way of obtaining money on the foreign markets. The Government learned for the first time perhaps that the foreign money market was not the easy and obliging medium that they had supposed, and that instead of the financiers of the world being ready to tumble over one another's heels to hand out millions to China they were positively reluctant to part with even hundreds of thousands or, for that matter anything materially helpful, unless upon the guarantees of their respective governments. The frame of mind which the bankers and the various governments had long ago reached, was that the time had come when a period must be put to indiscriminate lending to China upon intangible security, or upon security which could not be controlled by the lenders in the event of an internal break down or repudiation by the Chinese Government. Particularly was this view accentuated by the difficulty experienced by the President in forming a stable government. The foreign governments could not and would not back a mere man. Though the President may be the strongest man politically, as also from a point of view of statesmanship, in the country, he could not be backed as an individual. Death or deposition would put quite a different force in power, and the new comers might very easily decline to shoulder any millions borrowed by their predecessor. It is thought, indeed, that a future government would be well pleased to wipe out the great accumulating debt by r·pudiation, and though such an act would at once place China in the melting pot, this the lenders of to-day are not going to risk. On the question of the reform of the Salt Gabelle, however, it must be said and it is interesting to point out, that the parties in the negotiations have never come upon a common ground of discussion. The Chinese had never asked for details of the Bankers' proposals for reform, and the Bankers had never offered them but in very general terms. On the other hand all that the Chinese had offered were included in the memorandum quoted hereunder, which seems to satisfy their claim to accept "reform" of the Gabelle.

The financial needs of the Government were increasing with the effluxion of time, and inspired with the hope of raising a handsome amount negotiations were carried on with a loan promoter who was backed by a new and independent group of bankers, connected with which were the names of prominent London Banks. A preliminary agreement was signed in July, and a final one on August 30, for a sum of £10,000,000, and the terms given out were that the loan was for forty years at 95 and 5% interest, and secured upon the unmortgaged portion of the Salt Gabelle and land transfer taxes. As a fact the terms were later reported to be less modest, the Government accepting the loan from the promoters at 89, the promoter to issue it to the public at 95 and any profits secured above that figure to be divided with the Chinese Government. Great secrecy was maintained with regard to this loan negotiations for which were carried on unbeknown to the Group or the Legations, but news of it leaked out in the first week of September, and opposition at once began.

The result was that the Chinese Government was compelled to again realise that foreign money could not be easily acquired against the approval of the governments, and on September 16 the National Council was informed that the Government would be compelled to give up hope of raising an independent loan and would have to go back to the Group. That day a further advance of Tls. 3,000,000 was sought, but the Bankers were shy to a degree, though the amount would no doubt have been forthcoming upon a distinct declaration from the Government that it would suspend negotiations with all other sources and confine itself to the Group, accepting their terms with regard to security. It is more than of passing interest to notice how these preliminary advances are disposed of, and we are able to give below a detailed list of the expenditure of the amounts advanced between May 17 and June 18.

The following is the text of the memorandum regarding the Salt Gabelle which was handed to the Foreign Ministers by the Minister of Finance:

"Owing to smuggling and, corruption, the aunual salt revenue of this country in the late Manchu Government was a little over 40,000,000 taels. The Government now propose to create a Government Monopoly in selling salt and will not permit the salt manufacturers and the merchants to come into touch, as they will certainly exercise corruption to the detriment of public revenue. The plan is this: that the Government will buy the salt directly from salt manufacturers at a reasonable price and then resell it to the salt merchants.

"But to carry out this scheme there will be two periods:

1st period: The Government will still allow these salt merchants who possess the certificates to continue their business, as they have vested interests; but as above stated it will buy from salt land all salt, resell it to salt merchants and put a tax on every 100 catties we sell.

2nd period: A year or two after the execution of the method m ntioned in the 1st period, the Government shall dismiss all salt land-merchants in the interior and shall set up modern scientific factories in all the coastal provinces to manufacture salt bricks as is done in Holland now. By this method the monopoly of salt-selling territories shall be done away with and the Government will be the sole proprietor, and will receive tax on salt at the places of its production.

Now the total population of the Republic is about 420,000,000 and if each one consumes 13 catties a year, the total yearly consumption of salt will be about 5,460,000,000 catties.

"Now if we levy a tax of two dollars per 100 catties we should get a yearly revenue of $109,200,000 which is equal to 78,600,000 Chingping Taels. This proposed rate is far less than that of the old rate of the Manchu Government which was 2½ taels or about 3.50 per 100 catties. Thus we see that with a reduced rate of taxation which will lessen greatly the burden of our people and yet we can derive a yearly revenue of 78,600,000 taels and the excess ever the old revenue is 38,600,000 taels per year.

"But in carrying out our plan mentioned in the second period a capital of 50,000,000 taels is necessary for buying salt which will at a rate of ½ taels per 100 catties cost about 27,000,000 taels and the rest for the erection of salt warehouses and factories, engines, etc. Then of course the yearly revenue will be proportionately increased."

Following are the disbursements from the preliminary advances between May 17 and June 18:

FIRST INSTALMENT OF PROVISIONAL ADVANCES: 3,000,000 TAELS: MAY 17, 1912

	1912	taels
President's Bodyguard	May 22	90,000
Various divisions under the direct control of the Board of War	"	735,000
Right guard of the Wu Wei Regiment	"	60,000
Vanguard of the Wu Wei Regiment	"	20,000
Uniforms of the Imperial Bodyguard	"	20,000
Imperial Bodyguard	"	40,000
Salaries of the Military Advisory Office	"	10,000
Salaries & Expenditure of the Metropolitan Police	"	80,000
Military Court	"	3.500
Battalion of Infantry	"	20,000
Imperial Pension	"	19,049.864
Bannerman Allowances	"	339,861.6496
Redemption of Military Notes at Shanghai	"	1,500,000

SECOND INSTALMENT OF THE PROVISIONAL ADVANCES: 3,000,000 TLS. JUNE, 12

	1912	taels
Board of War	May 13	702,584.72
Metropolitan Police	June 18	61,371.61
Infantry Police	" 18	40,000.
Bannerman Allowances	" 15	326,133.466
President's Bodyguard	" 14	150,000
Right Guard of Wu Wei Regiment	" 14	126,819.968
Vanguard of Wu Wei Regiment	" 14	86,644
Uniforms and expenditures of Imperial Bodyguard	" 15	120,000
Military Court	" 15	6,757.7
Allowances for Naval students abroad	July 4	18,770.53 K.F.
Remittance fee (of above)	" 5	260.22 "
Allowance for Naval students in Paris and Coal for Haichi	" 12	54,380.68 "
Expenditures of all crews	" 17	60,561.8 taels
Torpedoes, Hospitals, Cablegrams, Medical supplies etc., etc.	" 17	5,526 "
Allowance for Military students abroad	June 12	29,418.62 K.F.
Redemption of Military Notes at Shanghai	"	1,000,000. tales

THIRD INSTALMENT OF PROVISIONAL ADVANCES: 3,000,000 TAELS, JUNE 18 1912

	1912	taels
Imperial Pension	June 26	500,000
Disbandment of troops at Nanking		600,000
Disbandment of troops at Shanghai		200,000
Disbandment of troops at Yangchou		200,000
Disbandment of troops at Pukou		200,000
Military expenditure at Chefoo and Tengchou		417,417
Commutation of Rice for garrison at East and West Tombs	1912 June 28	100,000
General Staff Building	" 26	30,000
Bureau of Printing and Engraving	" 26	10,000
Parliament Building	" 26	10,000
Supreme Court Building	July 11	24,893.8
President's Bodyguard	Aug.	168,202.2
Bannerman Allowances	"	322,569.6

The combined sums enumerated above do not exactly equal the amount of the provisional advances, there being some small items not yet reported.

Since the foregoing was written it has been reported, apparently authoritatively, that China has categorically refused the terms offered by the Six Power Group. It is necessary to look back some months in order throughly to understand what this action means to China. The Four Power Group was originally formed to prevent intriguing on the part of individual nations to secure political advantages under the guise of commercial concessions. That policy was inherited by the Six Power Group. Instead of blind, cut-throat competition for financial and political advantages, which would inevitably result in the impairment of China's national integrity, it was decided to adopt a form of co-operation that would tend to maintain China's rights while giving the financiers of the Powers most deeply interested in the country security for the rights already possessed, and the prospect of a share of the ultimate prosperity which the investment of further capital would induce. The Governments concerned recognised that this plan would conduce to the weal of China and the preservation of peace in the Far East, and they consequently extended their moral support to the Six Power Group.

In many quarters it was believed that if danger was to be apprehended to the new Republic, the quarters from which it was most likely to come were Russia and Japan. When, therefore, these two Powers joined the Group and identified themselves with the policy of collective rather than individual bargaining, it was felt that the strongest possible safeguard for China had been created. If these two Powers were animated by the predatory designs accredited to them their hands would be tied owing to their agreement to merge their interests with those of the others in the Group. The new Group, to which China is said to have irrevocably committed its destinies, is reported to include British, American, French and German interests. If this be so, then obviously Russia and Japan have been "frozen out" and are in consequence free to take whatever individual action may seem to them desirable. Thus the very danger against which the Six Power Group was designed to safeguard China, is again invited by China's own action.

The British and American Governments have announced that the new Group has no official support. It is difficult to see what other attitude they could adopt. Support was given to the Six Power Group because these two Governments, which are foremost in their advocacy of the Open Door and equal opportunity in China, considered that the policy for which the Group stood was most likely to preserve China's integrity and the peace of the Far East. In that the action of the new Group in putting a period to concerted action is subversive of this policy, it is impossible for the two Governments to afford it any countenance. In fact there seems to be a moral obligation upon them to prevent private financiers defeating a policy upon which their Governments have decided after long and careful consideration from a much broader viewpoint than is accessible to those whose main object is to secure returns from investments. Some difficulties will, therefore, be experienced in believing that China will finally commit herself to a course of action that will antagonise those who wish to befriend her and deepen the hostility of those from whom she believes herself to be in danger. At the moment of writing, however, the first moiety of the new loan has been successfully floated in London.

CHINA'S RAILWAY ENGINEERS

The continued expansion of China's railways and the growing necessity for a permanent staff of competent engineers directly in the service of the Government, should inspire the Board of Posts and Communications to take a lively interest in the engineers employed on the various lines now operating, or in course of construction, with the object of selecting the nucleus of a service which will before long become absolutely indispensable to the country. China should have her own engineers. She must depend upon railways for her development, and she must depend upon engineers for her railways. In the immediate future she will be launching upon construction schemes of great magnitude. Where that work will come under her own jurisdiction she should have at her command engineers who are qualified by experience in China as well as by practical effort elsewhere in the world. In the past the good engineer has come, has seen, has conquered, and has gone. Some of him have proved effulgently brilliant in the technicalities of the profession, lamentable failures in the gentle and delicate art of harmonising with the Chinese; some of him have been par excellent in comprehending the Celestial mind, deficient in the higher art of railways building, whilst others of him enjoyed the possession of both the quality of knowing how to work with the Chinese and the wisdom to be able to extract the best results from their own professional knowledge and training. Amongst the latter class is to be found the engineer and the man, and from that class China should begin to make a selection to provide for herself a staff of tried and trained servants who will make her interests their interests and their interests her interests. In short she should begin upon the creation of a properly organised railway service, adequate in every branch, competent to bring into realisation any of her projects, at once efficient from the engineering and general traffic points of view, and economic from the financial. There is scope for such a service, there will be absolute need of it in the not far distant future. On the numerous lines now operating or in course of construction are to be found men who have proved their worth in ability and character—men capable of obtaining the best results from the Chinese workmen and competent to strike the chord of harmony with the officials who must of necessity be associated with them in railway enterprises. In the past such men have been permitted to leave the country. The conditions of railway construction have been such that their services have not been required after the completion of the particular line upon which they have been engaged. They have worked a period of years; acquired not only a knowledge of the Chinese people and country, but in many cases have learned something of the language, and what is of greater importance, have possessed themselves of a knowledge of the capacity of the Chinese contractor and laborer, the worth of his hire, costs of his work, and peculiarities of his character, that constitute a priceless asset in any engineer destined to control such costly undertakings as that of railway construction in this land of the fleeting and the fluctuating dollar. Such valuable knowledge all goes with the engineers who leave the country, and has to be acquired anew by their successors. Mostly, new work in China has been commenced with sectional engineers, if not engineers-in-chief, absolutely strangers to the country, and their ignorance of the multifarious methods utilised by the dishonest among the Chinese to prevent the dollar from purchasing all that it is supposed by the engineer to acquire, has resulted in incalculable financial loss to China. How great a sum has been frittered away through lack of this peculiar knowledge on the part of new engineers will never be known, and whilst there are other avenues by which large amounts trickle from the sight and hands of the accountant, the fact remains that vast sums could be saved by the continued employment of selected men who have graduated in the university of local experience, and who have gained stores of information of the tricks of that great game of graft which has made the name of China a byword in those places where regard is entertained for probity and honest dealing.

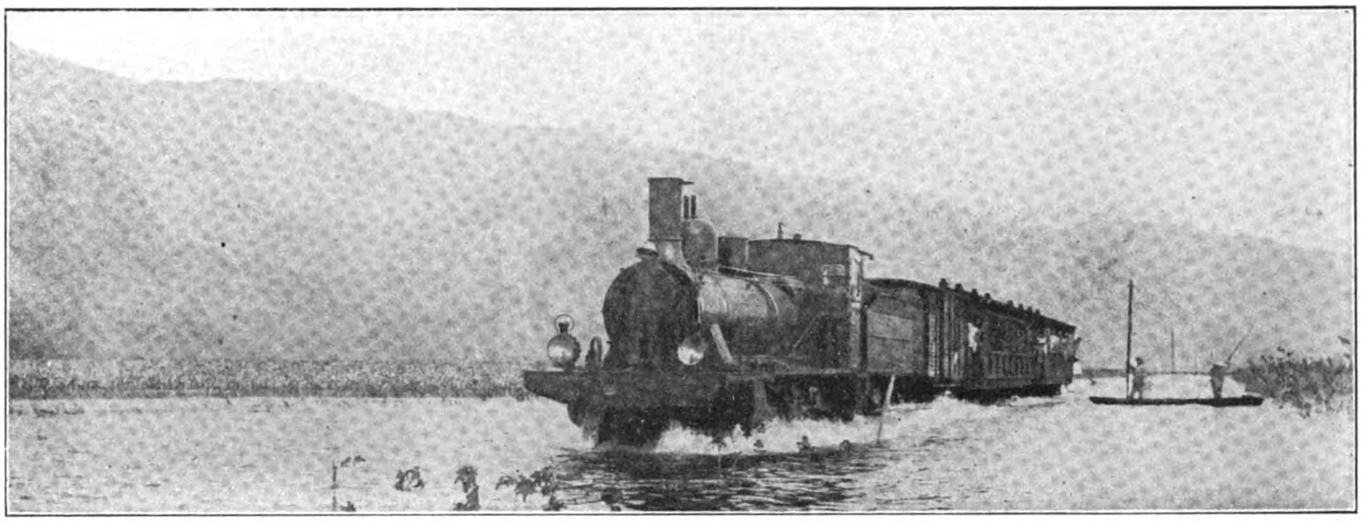
By judicious inquiry and selection from among the men who are "making good" on the lines now in course of construction, China could secure a sufficient number to establish a permanent service. The advantages of such a step are obvious. It would pay her a thousandfold in the future and would at the same time enable her to show appreciation of the services of those men who have "played the game" and given to their work the best that is in them. The inducements such a department would be able to offer would be a constant incentive to all engineers and others to do their best—and that is inspiration to constantly efficient work. From such China has the most to gain, but apart from selfish considerations on the part of China, it is not too certain that the engineers themselves have not some moral claim to consideration upon the expiry of their agreements. China will never appreciate, it is certain, what the railway engineer has given, and still gives, to her. Certainly he works for pay, and professes satisfaction with what his agreement stipulates, but there is a spirit which should enable a loftier view to be taken than that circumscribed and dictated by the cold requirements of the law. Engineers give years of their lives in distant, isolated parts of the country, severed for months at a time from their kind, deprived of society, bereft of friends, inadequately provided with food, and possessed of but meagre connection with the outside world. They do this for pay of course, but every servant being worthy of his hire, and every genuinely loyal servant requiting his employer to the full for his hire, is it not fair for them to expect upon proof of competent service, that they may be retained in the land wherein they have gained so much knowledge that is peculiarly fitted for employment in no other country than China, and when so much of the work for which they are eminently suited is yet to be done? If there is an affirmative response to this question, then the establishment of at least an engineers' service in connection with China's railways is the easiest way to confer immeasurable benefit upon China, and appreciation upon those who loyally serve her.

Kirin-Changchun Railway.—The present indications are that the Kirin-Changchun Railway will be ready for service between Changchun and Kirin about the middle of October. At present the construction work has progressed as far east as two miles on the east side of Tumenling Pass. This means that the available length of the railway is 48 miles, leaving a span of 31 miles from Kirin yet to be taken in hand. Even in this section the roadbed has long been finished, and only part of bridging work remains to be completed. The light-rail line winding up and down Tumenling Pass is to be replaced eventually by a through rail service to be constructed by following the original plan of excavating a tunnel through the Pass. In view of the straitened circumstances in which the Peking government has found itself, this scheme of accelerating the connection of Kirin with Changchun by rail through the adoption of the light rail service over the Pass meets the hearty approbation of every one interested in this Railway directly or indirectly. The management is looking forward to the flattering returns which this line will render. The fertility of the soil along the Railway is proverbial. It is capable of yielding a fine crop of Beans, Wheat, &c., for three consecutive years, without receiving attention other than the necessary weeding, &c., in the form of manure, &c., Especially Beans produced in this belt contain a larger percentage of fatty substances and fetch better prices. These cereals together with Lumber, Tobacco Leaves, Medicinal Herbs, &c. will be exported by rail, and imports such as Coal, Cottons, Tea, Shumshu, Matches, Toilette articles, Provisions, &c., will be found in good quantities for the trains to take back from Changchun to Kirin. The freight receipts to be realized during the five busy traffic months from November to the following April are estimated roughly at S. Y660,000, from which the working expenses, including salaries, sundry disbursements, expenses for construction, maintenance of way, and operation, and interest on the Railway Loans, may be deducted to the estimated amount of S. Y466,000. This will leave for the net profit the balance of S. Y194,000, which sum may be set aside for the construction fund of the tunnel piercing through Tumenling.

At present, the construction fund is being remitted from Peking in a sum of S. Y40,000 or so per remittance. It is expected that the whole outlay invested in this line, before it is opened to traffic about the middle of October, will total only S. Y3,500,000 which gives the average of about S. Y43,000 per mile. This will be the lowest average cost in railway construction on record, although the temporary character of the light rail line over the pass must be taken into consideration.

CLOSING THE DOOR IN YUNNAN

THE OPERATION OF THE FRENCH YUNNAN RAILWAY



TRAIN CROSSING TA CHUANG PLAIN, DURING THE FLOODS OF LAST YEAR

The opening to traffic in April 1910 of the French railway from Laokay to Yunnanfu terminated one of the world's most interesting romances of railway building. These 287 miles of mountain meter guage line are a magnificent tribute to French engineering skill, and as far as the construction work goes, will stand as a monument to the perseverance and ingenuity of man in one of his most disheartening combats against the combined forces of Nature.

Before the completion of the line, the optimistic element in Indo-China saw in Yunnan an Eldorado, and prophecied rich returns for the railway and great prosperity for the colony. With reasonable freight charges the line would draw to itself the trade of the entire province, and compete with Shanghai on one hand for the trade of Szechuan, and on the other with Rangoon for the trade of Western Yunnan and Eastern Tibet. There were others who maintained that the line would never pay unless it was extended northwards to Szechuan Province, in conformity with the original schemes of Governor Doumer, but whatever hopes the French might have had of securing a concession for this extension were abandoned when the Yunnan Viceroy through the Waiwupu, engaged the services of Mr. W. S. Dawley—an American Engineer—to survey a route from Yunnanfu to Suifu on the Yangtsze. The scheme of extending the line northwards into Szechuan, and attracting the trade of West and South—west China to Haiphong, was given such publicity by the French Press, that the Chinese Government resolutely refused consent to the plan. If it became necessary to construct the line with foreign funds, France undoubtedly would have brought pressure to bear on China, to monopolize the loan, so to avoid friction, the Chinese decided to build the line as a Yunnan provincial enterprise. The services of the American engineer were secured, the survey has been completed, and construction only awaits settled conditions in the country.

Warned by her experience in Manchuria, China recognized the necessity of a railroad entirely within her own territory, one that would release her commerce from the transit and other taxes imposed by the French line, and permit the free movements of her troops. Two years ago, Mr. K. S. Low, one of China's best railway engineers, was ordered by the Railway Board, to survey a route from the West River Valley into Yunnan. This line, after construction, would make China independent of the French railway and checkmate the scheme of building up the port of Haiphong with the commerce of China at the expense of Canton. But pending the construction of these lines, the French railway has a monopoly of carrying the import and export trade of Yunnan, or at least of those districts within the influence of the line.

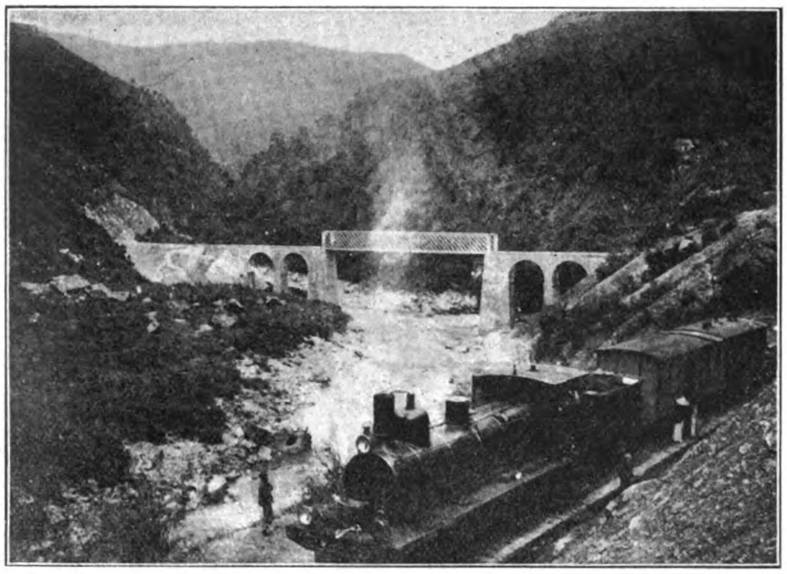
With such a bright prospect before them, and with everything their own way, it would seem that the French railway company would impose such tariffs, as would facilitate the rapid development of the province and create traffic for the railway. We find however that owing to the alleged high cost of construction, washouts, landslides and interruptions to the service, that the financial returns have been most disappointing. Instead of facing the situation in a manner calculated to inspire confidence and attract capital to the province, and encourage the expansion of trade, the railway authorities have adopted the policy of raising the freight rates to all the traffic will stand, and in addition, have devised a system of charges and taxation that for intricacy and mystery rival the old system of Chinese Hong milking. As a natural consequence traders are again taking to the older and cheaper river and caravan routes.

American Consular reports state that goods are still imported into Yunnan, Kweichow, and west China through Burma, thence by pack train to Bhamo and on to Tengyueh, and then to Batang about 400 miles north, or to Talifu, and even to Yunnanfu where the goods are distributed all over that part of the country, as they have been since the beginning of the trade. These costly means and tedious routes are used in spite of what would seem to be the manifest advantage of the rail route to Yunnanfu or to intermediate points and thence by the natural caravan routes to various points in the Province and west China.

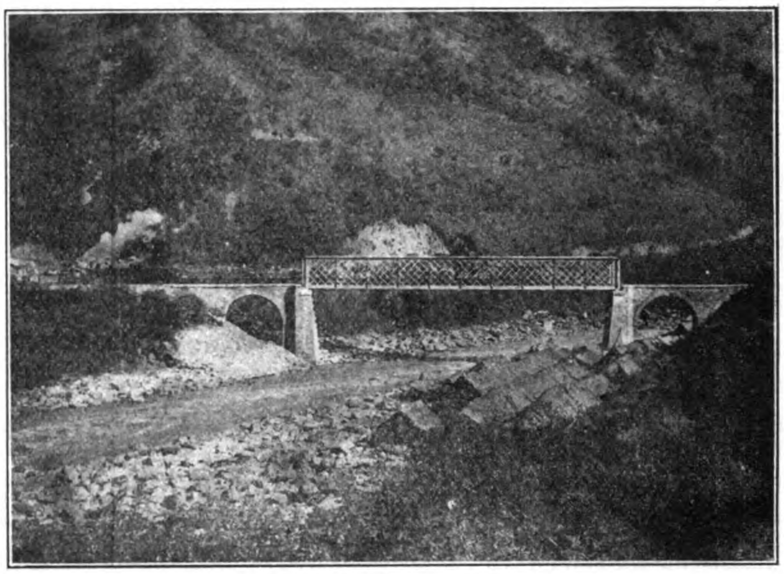
Another report says that the only serious drawback to the development of this interior trade along new lines is the fact that the French colony charges 20 per cent of its full import duty on goods entering Indo-China as a transit duty across Indo-China into Yunnan and Kwangsi Provinces. This transit charge is large enough to overcome the advantage of rail haul on foreign goods going into west China, and in spite of the railway's facilities, the trade returns from Customs stations like Tengyueh in West China, show substantially the same trade in goods imported by mule back from India that has been heretofore and before the railway's service to Yunnan and Szechwan was possible. Such goods have actually been delivered in Yunnanfu itself after 32 days transportation on mule back in direct competition with railway-borne goods.

The American Consul-General at Hongkong (George E. Anderson) in one of his recent

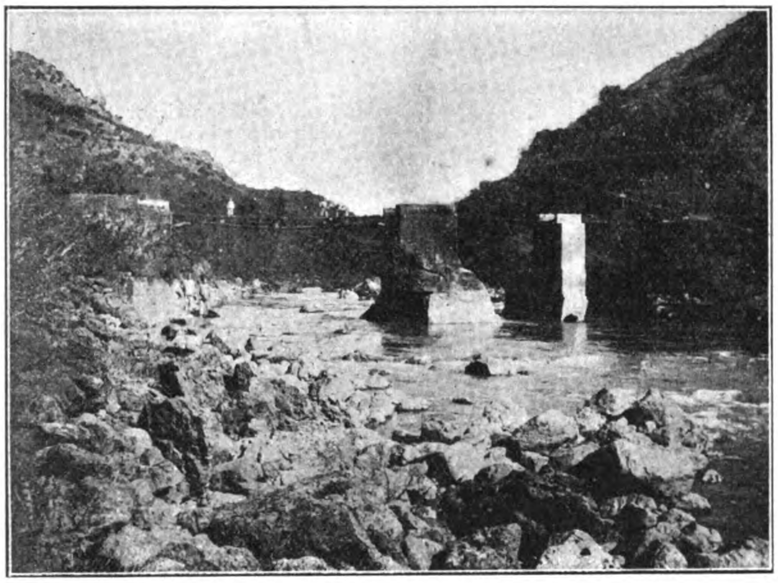
PE CHI-CHAI, THE STATION FOR MENGTZE



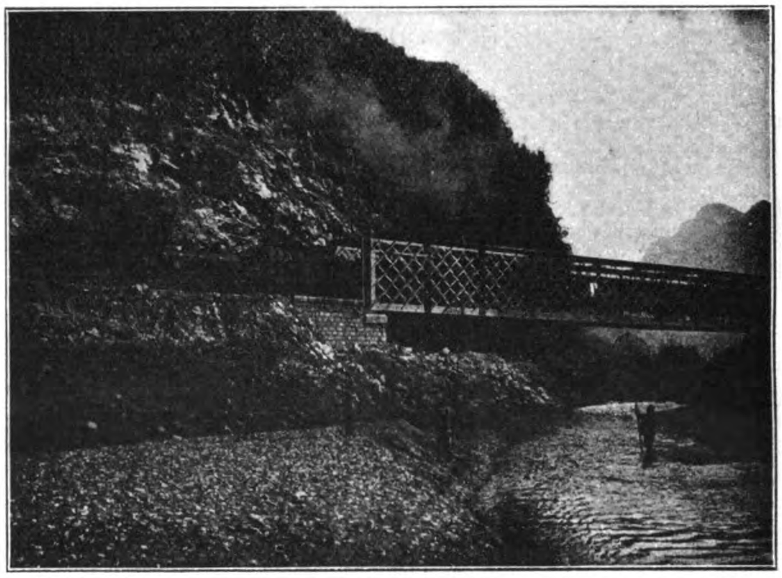
A SECTION BELOW LOU KOU CHAI



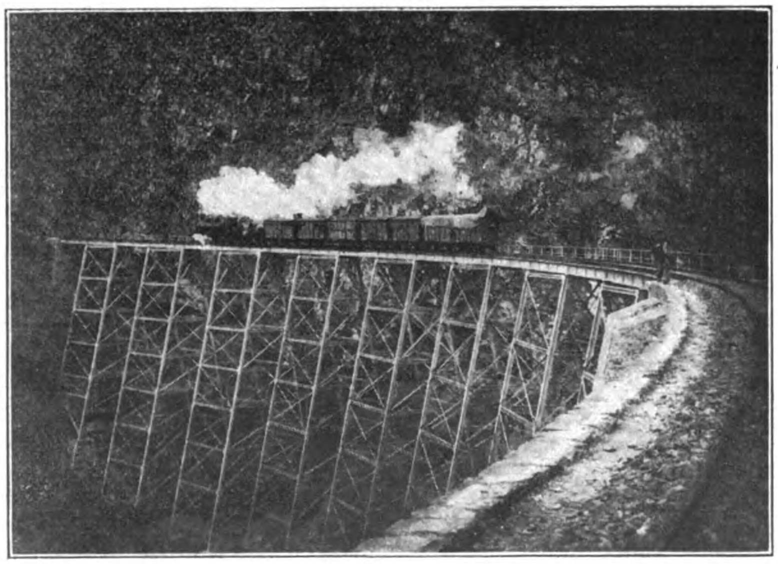
A BRIDGE ACROSS THE PALO-TAH-HO



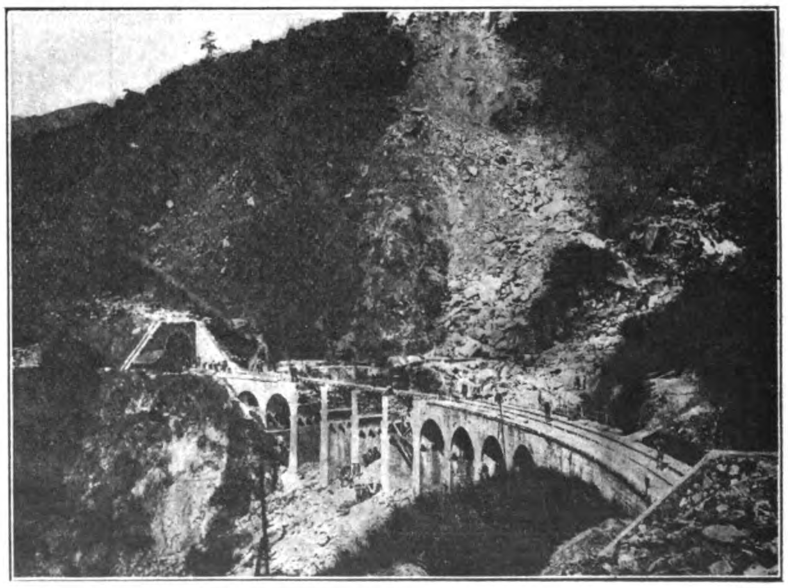
REMAINS OF A BRIDGE, SWEPT AWAY BY A FLOOD



A BRIDGE ACROSS THE NAMTI

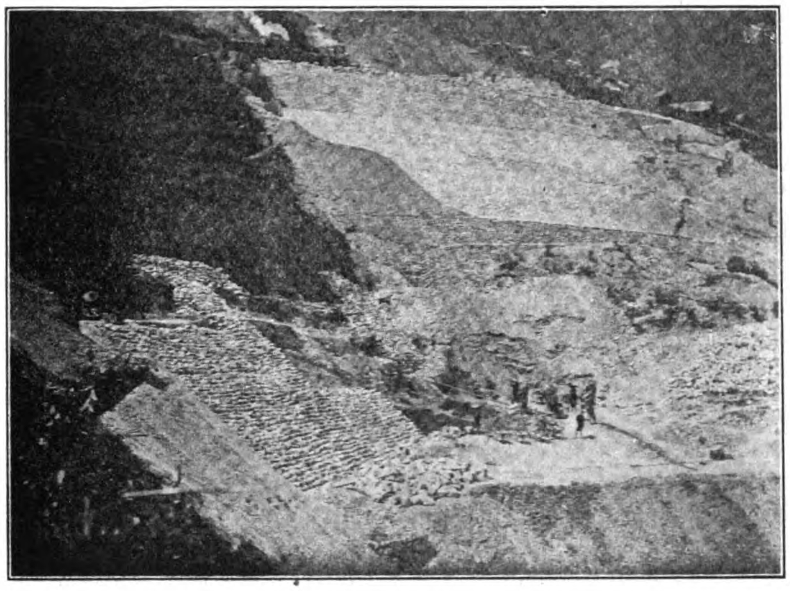


A LONG TRESTLE

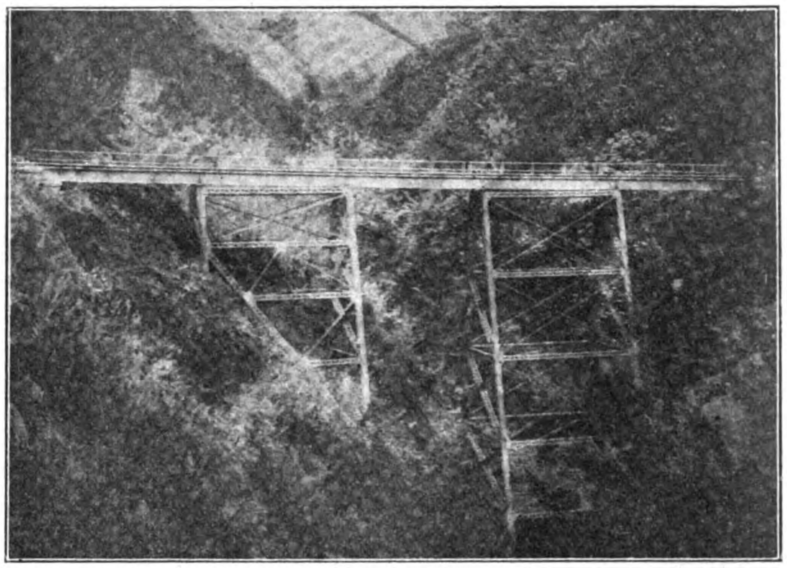


MASONRY BRIDGE CARRIED AWAY BY A LANDSLIDE

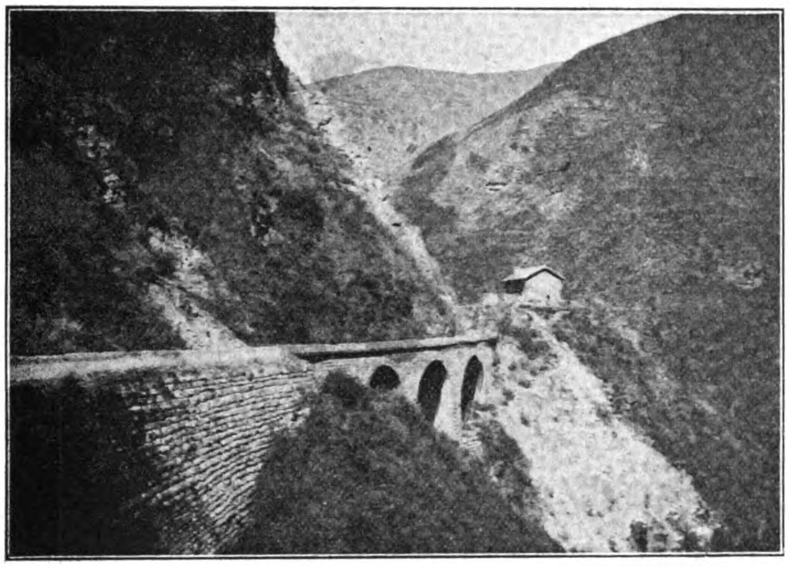
VIEWS OF THE YUNNAN RAILWAY



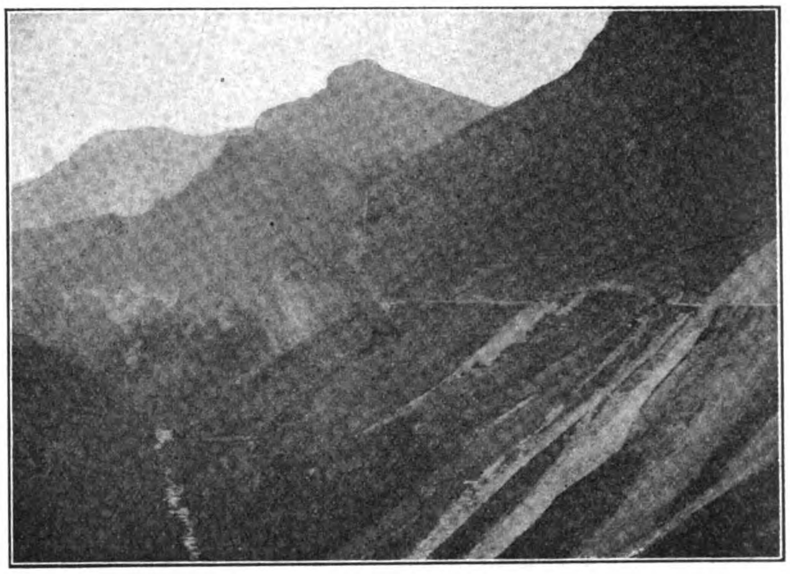
STAYING A LANDSLIDE



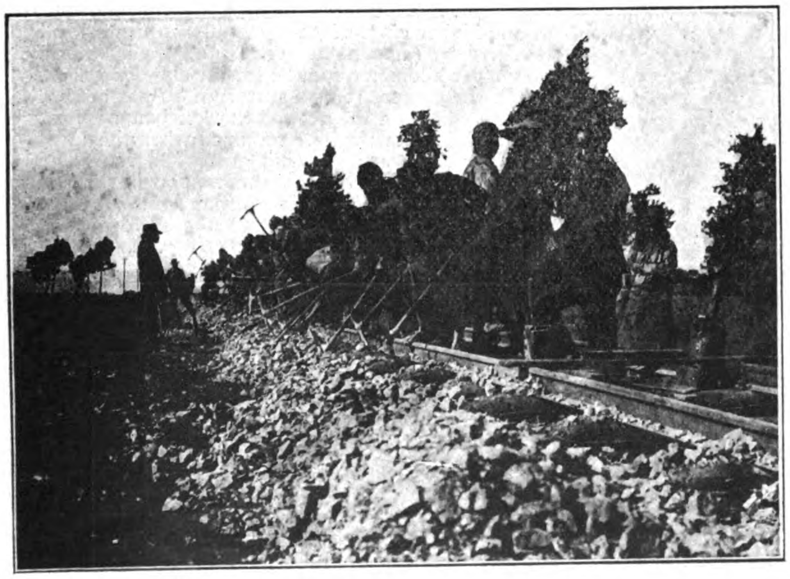
TRESTLE OVER A GORGE



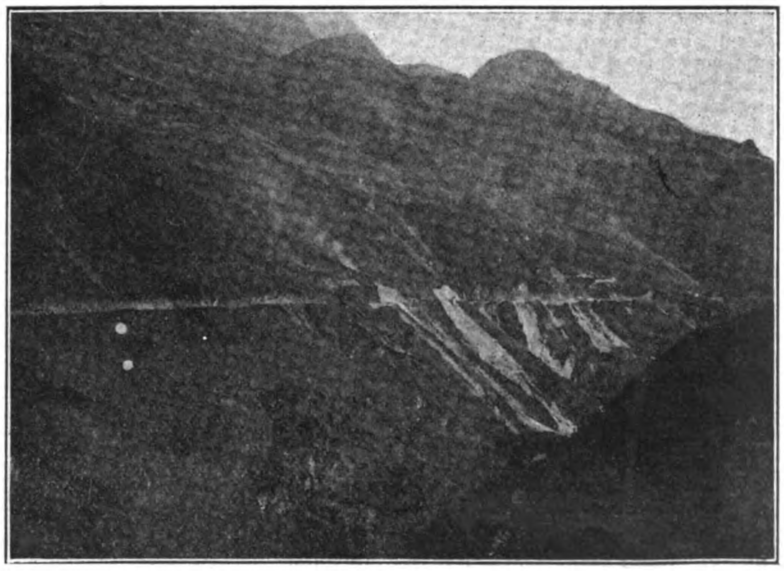
A SECTION OF THE LINE



A ROUGH SECTION



REPAIRING THE LINE



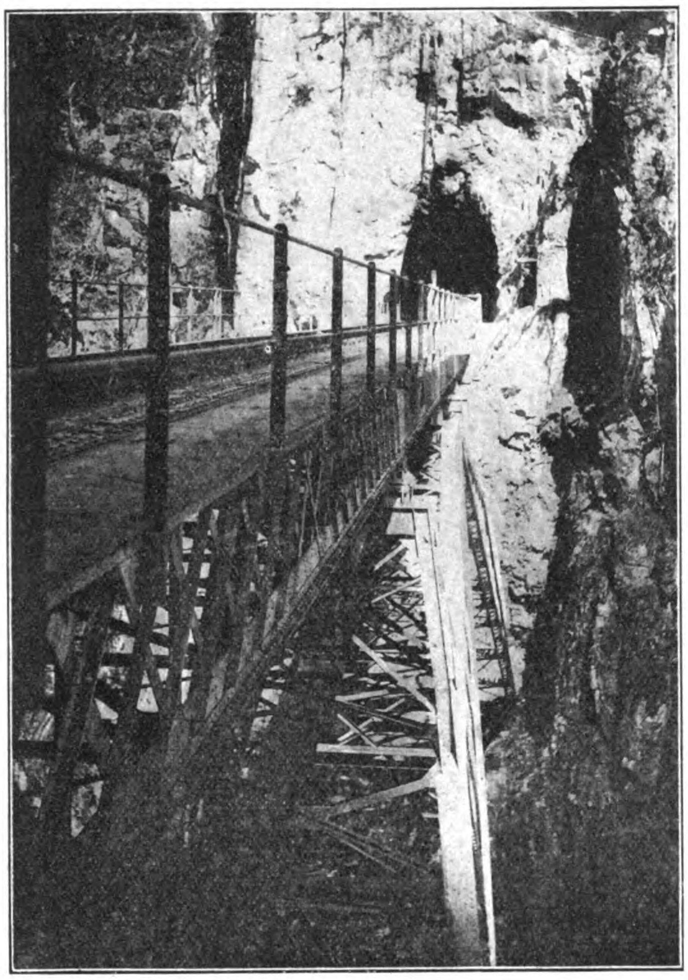
A SECTION OF THE GREAT HORSE SHOE

VIEWS OF THE YUNNAN RAILWAY

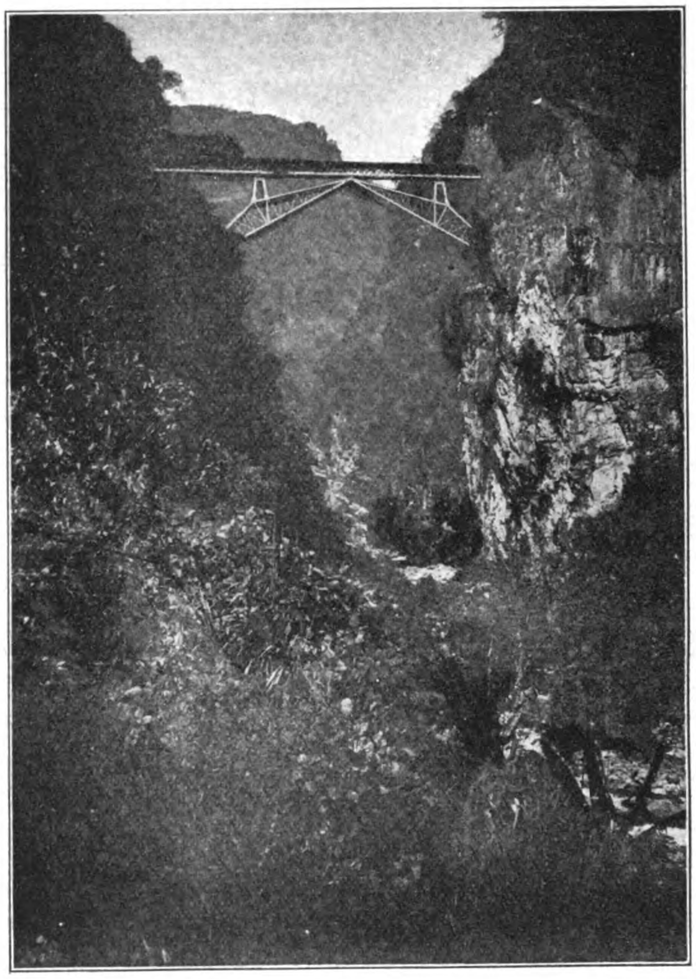
interesting reports, called further attention to the trade situation existing in Yunnan Province as a result of the working of the new railway. This document, republished in the June issue of the *Far Eastern Review* under the title of "Chinese Railway Project" is one of the most important contributions on the practical operation of foreign controlled political railways in China. Aside from one or two editorial comments in the Hongkong daily papers, the report has attracted little or no attention throughout the Far East. We venture to assert that if the same report had emanated from any foreign consul stationed in Manchuria, every newspaper in the Orient would have given it full publicity with editorial comment as another evidence of Japan's violation of her pledged word, and as proof of discrimination against European or American shippers in the operation of the South Manchurian Railway.

Consul-General Anderson opens his report with the following significant paragraph:—

"At the instance of the consulate general in Hongkong, several American manufacturers of railway material have sent a representative to Mengtze and Yunnanfu (both cities in the Province of Yunnan), and two important locomotive companies also have men on the ground, in connection with the contract to construct the proposed line from Yunnanfu to Luchowfu, on the Yangtze River, in the Province of Szechwan. *The matter of freight rates, however, over the French railway from Haiphong, in French Indo-China, to Yunnanfu, is of such controlling importance that the projectors of the line are seriously considering the construction of a line from Yunnanfu to Nanning (on the Yoo River in the Province of Kwangsi), as a means of avoiding these excessive charges, as well as opening up the Province of Yunnan and west China by the new route.* This road would give communication by rail and water with Hongkong and Canton."



THE FAMOUS BRIDGE



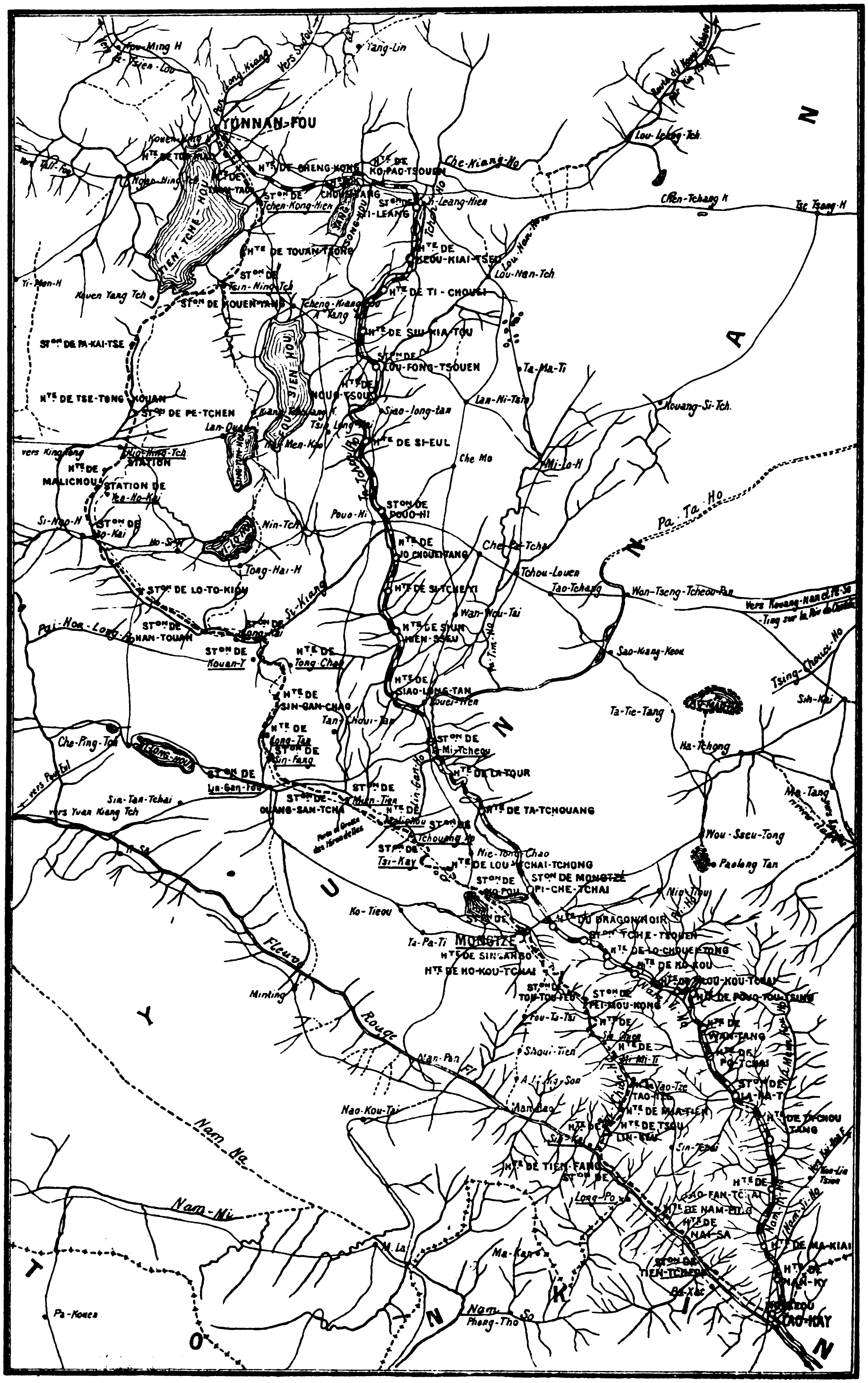
VIEW OF SAME BRIDGE FROM THE CANYON

THE BOULDER THAT CARRIED AWAY THE MASONRY BRIDGE (SEE PRECEDING PAGE)

In other words the above paragraph tells the world that owing to the exorbitant freight rates exacted by the French authorities on material for the construction of projected Chinese Government railways in Yunnan, it is considered more economical to construct an entirely new railway through Chinese territory from Yunnan to an outlet on the West River, than pay the prohibitive French charges. In concluding the report Mr. Anderson states "In addition to freight on the long ocean haul from the United States to Haiphong, the freight on rails from Haiphong to where they are needed is about 150 per cent of the actual price of the rails in the United States."

The rates are quoted as follows:—"These rates are upon five classes of freight and are assessed upon the basis of five zones between the seaboard at Haiphong and Yunnanfu. The rates are based upon considerations of comparative value and comparative bulk of goods as well as weight, and in general follow similar classifications in France. They vary from 11 to 26 cents local currency (4.73 cents to 11.18 cents gold at present exchange) per metric ton (2,240 pounds) per kilometer (0.62 mile) for the higher class of goods to 4 to 10 cents local currency (1.72 to 4.3 cents gold) per metric ton per kilometer for the lowest class of goods. To the present rates a surtax of 10 per cent is now added on the ground that exchange is low, but this surtax will be removed when the local dollar will equal 50 cents gold. On the basis of the rates fixed in the regular tariff the charges on the different sections for the several classes of goods amount to the following in gold dollars per metric ton:

Sections	Distance	Class 1	Class 2	Class 3	Class 4	Class 5
	Miles					
Haiphong to Yenbay	104	$11.73	$9.60	$9.60	$5.33	$4.26
Yenbay to Lao-kai	87	7.28	5.92	4.58	3.64	2.73
Lao-kai to Mengtze	111	19.90	16.07	12.25	9.95	7.65
Mengtze to Amsichou	27	2.40	1.95	1.48	1.20	.93
Amsichou to Yunnanfu	152	13.65	11.02	8.40	6.82	5.25
	481	54.96	44-56	36.31	26.94	20.82
Surtax	....	5.50	4.45	3.63	2.69	2.08
Total	....	60.46	49.01	39.94	29.63	22.90



OFFICIAL MAP OF THE YUNNAN RAILWAY

SCALE 1/1.000.000e

0 5 10 20 30 40 50 Kil.

---------- ORIGINAL SURVEY

PRESENT ROUTE OF RAILWAY

EXTRA FEES.—The rates on various classes of goods from Haiphong to Yunnanfu, therefore, a haul of 481 miles, range from about $23 gold to over $60 gold per metric ton. To the rate of $23 to $60 per ton from Haiphong to Yunnanfu, the railway company adds a charge of about $3 local currency, or $1.30 gold, as a "customs" charge, which seems to be designed to cover the clerical expenses of clearing goods through the Indo-China and the Chinese customs. The charge has, however, no actual connection with the customs duties, and is independent of the duties levied either in China, where 70 per cent of the usual Chinese customs duty is collected or in Indo-China, where 20 per cent of the full import duty on goods from abroad is collected as a transit tax on goods thus entering China. The freight rates above given are modified somewhat by rates for carload lots, but are increased for goods of a dangerous nature, considerable quantities of which are used in railway construction and mining enterprises."

Since the above official report was made, we have received corroborative data from Yunnan concerning these freight charges and extra fees.

As indicated by Mr. Anderson, the freight rates are calculated on a fixed exchange of francs 2.50 to the Mexican dollar. At this rate of exchange or under, an arbitrary surtax of 10 per cent is added, to make up the loss in exchange. If the exchange is over francs 2.50 to the dollar, the rate is reckoned at par. So no matter what the fluctuations of silver are, the shipper pays the railway "coming and going." As the dollar has only once since 1910 exceeded in value francs 2.50 in practice the 10% surtax has been almost permanent.

In addition to the exchange surtax, an arbitrary charge of $4.44 (Mexican) per five ton car is levied at the frontier, ostensibly for examining the seals by the customs officials. If the shipment is less than a five ton car load lot, the charge is reckoned at 20 cents per package on the entire shipment. This, notwithstanding the fact that cars with small lots are dispatched through to Haiphong direct without breaking the seals.

The freight rates are undoubtedly exceedingly high, and in addition to this heavy burden on commerce, it is freely claimed, notwithstanding consular and official assurances to the contrary, that discrimination exists in favor of goods shipped to or from France. It is furthermore asserted that shippers other than French, are saddled with charges levied in Haiphong on import and export consignments that do not show in the official published railway rate schedule, and which are contrary to treaty stipulations.

There are five main classes of freight. Under the First Class are comprised provisions, explosives, beeswax, machinery, glass, porcelain, sugar, leather goods, light hardware, piece goods, paper, etc. The through rate to either terminal is $127.91 (Mex.) per ton, plus the 10 per cent exchange surtax, plus 20 cents per package frontier charge. We are informed that railway construction material is also included in this class since the failure of the French Regie in Hanoi to obtain the contract for the short railway line from Mengtze to the Ko'chieu tin mines in March last. For car load lots of Class one, or over 5 tons in one shipment, the charge is $104.03 per ton, plus 10 per cent plus frontier charge of $4.44 per car.

This bears out Mr. Anderson's closing statement concerning the freight on rails from Haiphong to the interior making the rate from $118.87 or say $55 to $58.00 gold per ton.

Class 2 includes such items of Chinese freight as native candles, ham, comestibles, beer in cases, mineral waters, mineral oils, cereals, jute fiber, Chinese sugar, matches, &c., and the rate is $104.035 plus the charges as in Class 1. In carload or lots of over 5 tons, $79.45 plus the same excess charges.

Class 3 includes tannery materials, stearine, crude oils, sesamun seed, rice, rivets, potatoes, beans, jute in bales, insulators, gavanized wire, nails, coal, briquettes, etc. Rate $79.45 per ton, plus charges as in Class 1. In carload or lots over 5 tons, $62.715 per ton, plus the surtax and frontier charge.

Class 4, spelter, cotton yarn, raw cotton in bales, undressed hides, coal in bulk, bamboos, leaf tobacco, ores, native oil, marble, building stone, native iron, pig iron, &c. Rate $62.315 per ton. In carload lots or over 5 tons, $48.46 plus the excess charges.

Class 5, is for shipments of 10 tons or over, and includes spelter in ingots or slabs at $35.00 per ton, plus 10 per cent, plus $8.88 per car frontier charge, copper in ingots or slabs $70.00 per ton, plus charges, metal for coining cash, $60.00 per ton, plus charges, &c.

Even with this classification merchants declare that it is impossible for the shipper to know where he stands, as each shipment has to be referred to the railway authorities for the determination of its classification and through rate. These are changed arbitrarily without any notification to the shippers.

The through rates quoted above are for slow freight (*petit vitesse*) and the railway company reserves the right to take any time up to 27 days for delivery, the average time being 16 days for the through run of 830 kilometers. The cararan time from Burma, is about 32 days. Fast freight (*grande vitesse*) which averages six days from Haiphong to Yunnan fu, charges from 10 to 15 per cent advance on the slow rates.

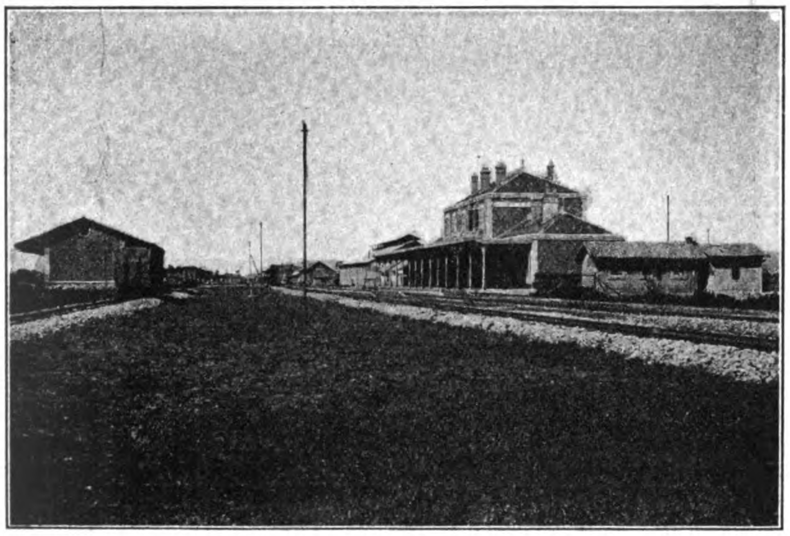
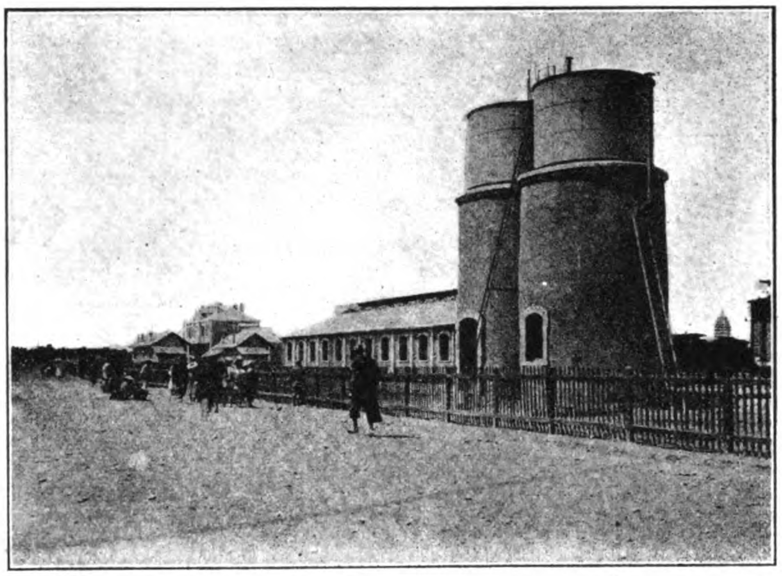
As the railway has only been open since December 1910, and the service was interrupted from May to December 1911 and again in April last, by washouts and land slides, another excess charge has been created. This is termed "Transbordment Charges" consisting of an extra tax ranging from $1.00 to $1.50 per ton, for transferring freight from one side of the break to the other, at the most about 100 yards.

Another source of railway income arises from the fact that bank checks or compradore orders are not accepted in payment for freight anywhere on the line, except from accredited French firms, and if the freight is settled for in Yunnanfu or Haiphong an extra charge is made to cover the cost of shipping the silver to Hanoi (the head office of the railway) at first class rates.

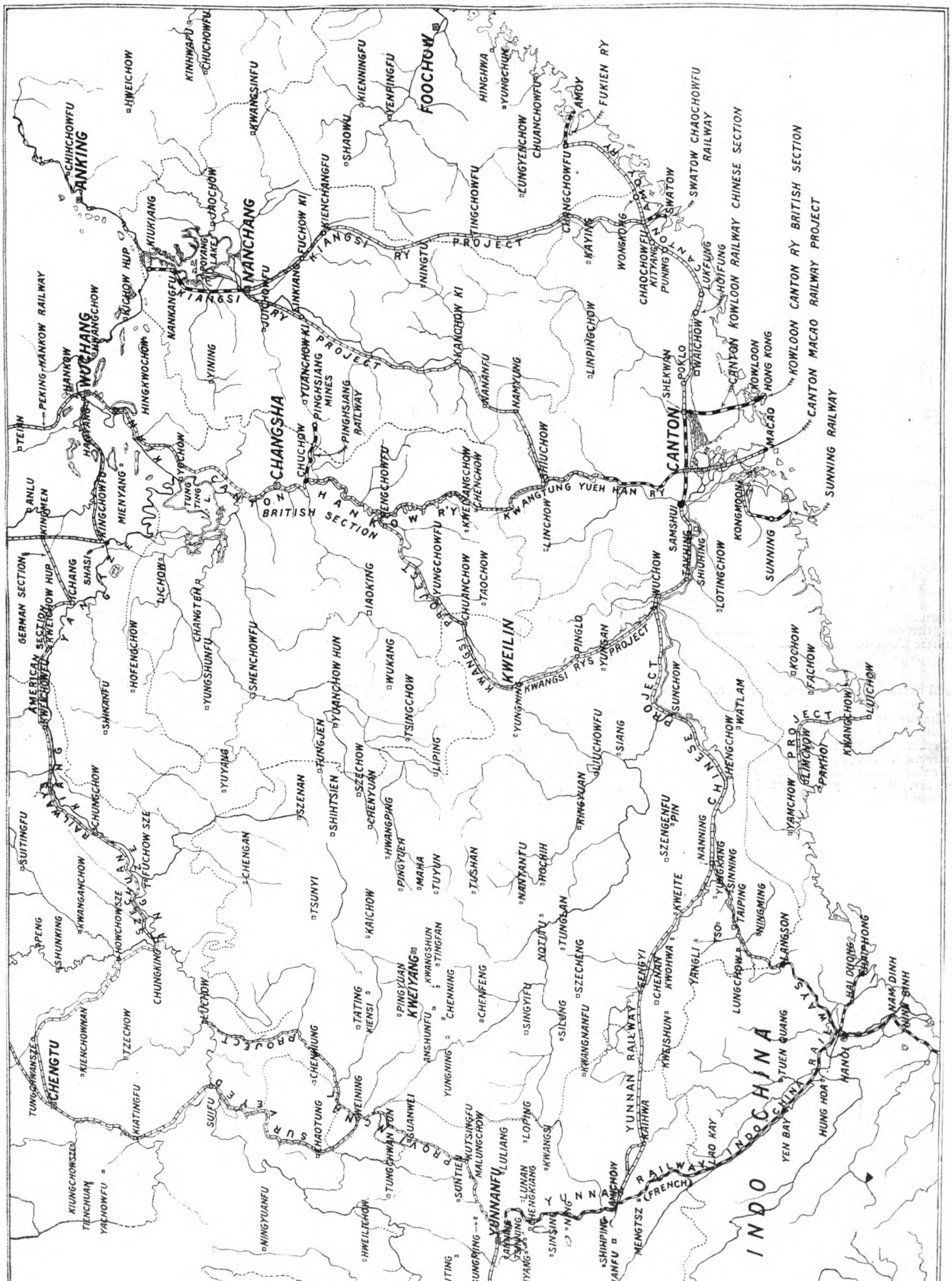
French products are protected in many devious ways known only to the officials, and as an instance it is maintained that Hongkong refined sugar is sold at Haiphong 30 per cent cheaper than the French product, but with the addition of the 7½ per cent French transit tax on this sugar, it cannot be sold in Yunnan at prices that will allow it to compete with the French article. Cigarettes manufactured in Pootung in China, under the treaty should be allowed to pass through Tonking at a transit tax of 2 per cent, but this is not allowed by the French authorities and the full transit tax of 7½ per cent is charged, plus first class railway rates, which together with other charges come to 100 per cent of the actual value of the consignments in Yunnanfu. The imposition of such excessive rates is sufficient in itself to throttle trade and discourage shippers, but when the many surcharges are piled on and every petty annoyance possible is added to make merchants other than French feel their dependence on the system, the time must come when these foreign interests will resent the unfair treatment and request the observance of the treaties, and the rules of fair play.

The transit trade of Indo-China is largely the transfer of the products of the Chinese provinces of Yunnan and Kwangsi to Hongkong, and of various foreign products from Hongkong to the provinces. Over 95 per cent of this entire trade inward and outward is with Hongkong, which acts as the great distributing center for all countries. So the excessive freights rates and petty and illegal charges of the French railway tend to undermine Hongkong's commercial position, striking first at British commerce and through it at other countries interested in Western China trade.

It is almost hopeless to expect action on the part of any government in behalf of its nationals trading in Yunnan beyond a perfunctory representation of facts to the French Government. China, who should expect

THE STATION AT YUNNANFU



THE FAR EASTERN REVIEW RAILWAY MAP OF SOUTH CHINA, SHOWING EXISTING AND SOME OF THE PRINCIPAL PROJECTED LINES.
DR. SUN YAT-SEN'S SCHEME IS NOT SHOWN ON THIS MAP

the greatest returns from the operation of the Yunnan line, is compelled in self-defense in order to develop the province to construct a new trunk line within her own territory at a cost of many millions. And just as soon as political conditions simmer down in China, and the country is again on its financial feet, the railway across Kwangsi to Yunnan, will be one of the first to claim the attention of the Chinese authorities. Once constructed, this line will divert the Yunnan trade that is now compelled to flow through Haiphong and over the French railway, into the ports at the West River delta, or Canton and Hongkong. In Tongking the danger of losing all by the grasping policy of the present regime is fully realized by the community at large, and the cry has already arisen for a sweeping reduction of the railway tariff charges, lowering of the transit dues, abolition of unjust taxes and the making of Haiphong into a free port.

An idea of the burdens imposed on Chinese trade passing through French territory may be gained from the following itemization of the charges levied on a trial shipment of merchandise from London to Yunnanfu. The bills of lading and invoices were signed by the London Chamber of Commerce and vised by the French Consul General at London, and shipped direct to Haiphong on a French steamer. Under treaty such shipments should be subject to the minimum tariff. The Shipment weighed 572 kilos gross and 380 kilos net and the net value landed at Haiphong was $228.40 Mexican.

Value of m'dise at Haiphong	$ 228.40
French transit due	15.79
Dock charges	.87
Disembargement (lighterage handling)	2.08
Chamber of Commerce(Statistical Dept.)	.48
Teage	.35
Tout palan	.44
Commission on transit dues	1.35
Station charges	1.20
Railway freight (572 kilos 1st Class)	77.25
Transbordment charges	1.00
Frontier charges (11 pks @ .20)	2.20
Chinese Customs	24.48
	$ 127.49
	228.40
Total cost of 380 kilos net at Yunnanfu.	$ 355.89

The passenger tariff in force over the line is as follows:—

Distances between sections.

1st section. Haiphong docks to Yenbay	248.	kilometers
2nd section Yenbay to Laokai (frontier)	142.	"
3rd section Ho-Kow, (frontier) to Amichou	221.	"
4th section. Amichou to Yunnanfu	252.	"
Total	863.	"

Passenger tariffs per kilometer.

1st section.	2nd section.	3rd sect.	4th sect.
1st C. 0.05	0.06	0.065.	0.065
2nd C. 0.035	0.040.	0.045.	0.045
3rd C. 0.02.	0.023.	0.025.	0,025.
4th C. 0.006	0.007.	0.008.	0.008.

(Fourth class is for Chinese and Annamese *only*).

25 kilos of baggage free, excess varies according to class and section from 0.17 cents per ton kilo, in 1st to 3rd classes on 1st section, and 0.10. per kilo ton on same section for baggage 4th class, to 0.30 100 kilograms, per Kilometer on the first three classes on the 3rd section.

For tickets bought on the cars, the charge is approximately 30% in advance of the above rates.

The French railway authorities defend the high tariffs as necessary to secure a fair return on the investment, and defray the high cost of repairs and maintenance. The line is built along the sides of steep canyons for miles, and each rainy season causes serious landslips which tear away the rails, destroy masonry bridges, and create general havoc, which paralyzes traffic for weeks and months. Floods inundate complete sections and have carried away several steel bridges, which have had to be replaced. At one place as shown in the illustration a landslide carried away one of the strongest masonry viaducts of the line. Many embankments are so steep that heavy and expensive masonry reinforcements are necessary. It is natural that each rainy season will bring trouble until the material has taken a slope at which it will stand. In the meanwhile the railway engineers have some serious problems to handle. In one place the slides are so frequent and the slope so steep, that they are building an artificial tunnel so that the mountain may slide down over it. At the present time we are informed that owing to the many transfers around the breaks of the line, goods can only be shipped in packages weighing 40 kilos or less.

These conditions, which make the through shipment of heavy freight impossible at the present time, may be the reason why the railway authorities have imposed the first class rates on railway material, to discourage such freight until the line is better prepared to handle it.

Official corraboration of the above state of affairs also appears in the Report of Mr. C. E. Tenant, the Commissioner of Customs at Mengtsz, dated April 15th, 1912. Mr. Tenant says.—"The causes for this diminution of trade are many; but the most important were the interruption of goods traffic on the railway, which lasted three months or so between Tonkin and Mengtsz and six months between Mengtsz and Yunnanfu, and, later on, the looting of Mengtsz by the Linanfu troops on the 3rd December. The disastrous interruption of goods traffic was the indirect consequence of the want of care on the part of the first engineers who surveyed the intended railway line. It is obvious that steep cutting in a comparatively soft soil cannot but result in gradual landslips, and when this cutting is done on a hillside—as has been done for about three-fourths of the whole length of the line from Laokai to Yünnanfu,—the whole hill surface must gradually slide down until nature has formed again a natural slope. Since the beginning of the construction of the line there have been landslips, but never so bad as during this year. They were due to the unusually early and severe rainy weather, which commenced at the beginning of May. The effects of the rains were felt not only on the railway line, but all over the province, and for three months we only heard of rains here, floods there, etc. A bridge at about Kilometre 91 was cut in two by a massive piece of rock which came down from an overhanging cliff some 300 feet up hill. Another bridge over a small canal, nearly dry in winter, in the plains of Tonkin, near Vietri, had its foundations undermined by the violence of the eddies; while practically the whole delta of Tonkin was under water."

"All native goods for this province imported *via* Tonkin, being transhipped at Hongkong—a foreign port—for want of through steamer communication between all Chinese ports (Pakhoi and Hoihow (Kiungchow) excepted) and Tonkin, are *ipso facto*, extraterritorialised, and on their re-entry into China are treated as foreign goods."

"Before closing this report, I have to refer to the transit dues, *in some cases exorbitant, which are imposed on all foreign goods in transit through Tonkin.* Were both Chinese and French Indo-China tariffs equal, there would be nothing to say; but, with the exception of opium, China is only allowed by treaty to collect duties on this land frontier according to the obsolete 1858 tariff, diminished by three-tenths on imports and fourtenths on exports, and as this 1858 tariff, fixed originally on a 5 per cent. basis, does not, on the average, represent nowadays much more than about 3 per cent. *ad valorem*, and as this very light duty is still lowered by three-tenths and four-tenths, the tariff does not come to more than 2½ per cent. *ad valorem*. This may be roughly checked by a glance at our figures. We show imports amounting to *Hk.Tls.* 4,647,996. Deducting *Hk.Tls.* 128,688, representing duty-free railway materials, there remains *Hk.Tls.* 4,519,308, on which a 5 per cent. duty would be *Hk.Tls.* 225,965; but our import duty amounted to only *Hk.Tls.* 112,395, representing just 2.5 per cent. *ad valorem*. For exports, with a total value of *Hk.Tls.* 6,750,304, a 5 per cent. duty would represent *Hk.Tls.* 337,515, while our collection, *Hk.Tls.* 89,269, is equal to only 1.3 per cent. Compared with this, we find, for instance, in Tonkin, duties on cotton yarn varying between 34.50 and 42 francs per 100 kilogrammes, or *Hk.Tls.* 6.30 to *Hk.Tls.* 7.67 per picul, the fifth of which (or Tonkin transit dues) amounts to *Hk.Tls.* 1.26 to *Hk.Tls.* 1.53 per picul, while the whole import duty in China is only *Hk.Tls.* 0.700 per picul, and with the reduction *Hk.Tls.* 0.490. The difference is still more felt on tobacco, with a 75 francs import duty, or 15 francs transit duty, per 100 kilogrammes; and it becomes prohibitive with cigars and cigarettes, with 250 francs import, or 50 francs transit, duty per 100 kilogrammes. In fact, I am informed by the representative of a large cigarette firm that he can import a case of 20,000 cigarettes, Shanghai made, *via* Canton and West River, laid down in Mengtsz, for $23 or $24, while the same case *via* Tonkin comes to $30 to $32. This speaks for itself. *That the French Government should desire to protect its own industry and that of its colonies in its own territory seems quite natural, but that it should practically stop by too high tariffs foreign goods from competing on this market seems inconsistent with the principle of equal opportunities proclaimed broadcast* as *regards trade in China.* If trade with this province is to be fostered, it can only be done by the reduction of these Tonkin transit charges and by cheaper railway freight."—"A survey to link up Yünnanfu with the coast by way of the West River was completed by Taotai Lo Kuo-jui, who had been specially deputed by the Board of Communications in 1910. The future line would start from Poseh, above Nanning, on the West River, reach the south-western corner of Kweichow province about Singihsien, enter Yunnan province towards Lopingchow, go north to Kütsingfu, and west to Yünnanfu. This line, if ever built, will be a formidable rival to the Yunnan-Annam Railway; and the policy of high freights and high transit duties in Tonkin will certainly account for much in its early construction."

Official and private reports all accentuate the facts above described. Excessive freight rates, illegal charges and unfair discrimination against products other than French, are closing the Door in Yunnan to European and American trade. The alleged unfair practices of Japan in Manchuria pale into insignificance before the conduct of France in Yunnan. China is weak, her despoilers are strong. What are the advocates of the Open Door and equal opportunity going to do about it?

(G. B. R.)

The Kiangsu Railway.—The directors of the Kiangsu Railway have petitioned the President, complaining of the unfair treatment of the British Corporation to the Railway Co., as under an agreement between the former Manchu government and the corporation, the corporation has only advanced Tls. 1,800,000, and on pleas withhold Tls. 12,000,000 which is deposited in the bank, drawing interest only at 2 per cent, and the ministry has to pay 5 per cent. on the money which causes a great loss. The directors ask that the ministry arrange some plan of work by which to draw the loan and not suffer it to remain idle. The ministry has been directed to consider and report on the subject.

The Yuet-Han Railway.—Recently a telegram was received by the directors of the Yuet-Han Railway from Szechuen stating that the people there have approved of handing over the control of the railways to the Government and asking that the shareholders in Kwantung should consider the question also, and let the Yuet-Han Railway become the property of the Government. However, the opinion at Canton, says a correspondent, has not changed since this question was mooted before, and the Cantonese are prepared to meet it with the strongest opposition. Quite a lot of trouble was caused about nine months ago by the Government's proposal to take over all the railways, and the feeling then engendered has remained, so that there is no hope of this proposal coming to anything.

THE RAPE OF MONGOLIA

RUSSIA'S RAILWAY POLICY IN CENTRAL ASIA, CLOSES THE DOOR TO EQUAL OPPORTUNITY IN MONGOLIA

MONGOL LAMA AND ATTENDANTS

MONGOL SORCERER. NOTE THE HAM BONE IN LEFT HAND

A GRAND LAMA OF MONGOLIA

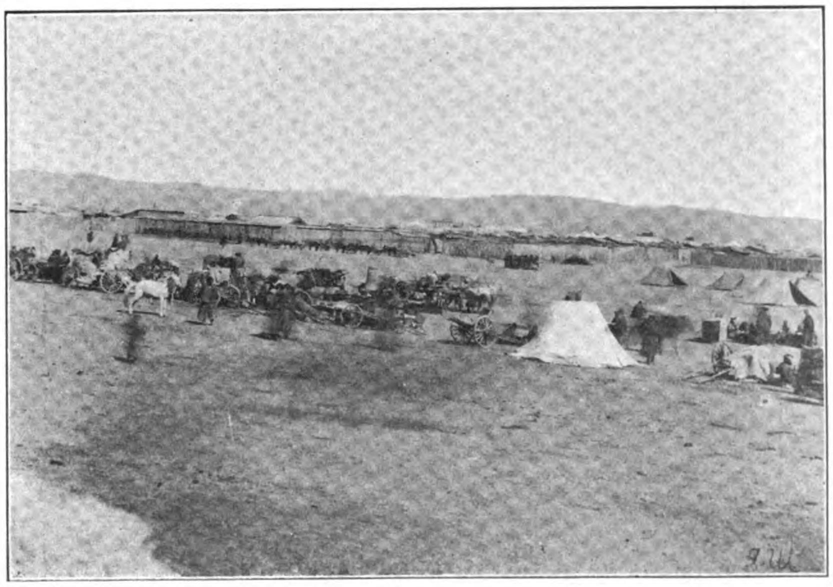
It has long been accepted in diplomatic circles that one of Russia's cherished plans, was to secure for herself the construction of a railway across Mongolia, from Kiakhta to Kalgan, and thus control a direct approach to Peking, invaluable to her commercial expansion and necessary to her political programme. There is ample evidence to prove that Russia has pressed China at various times to grant her a concession to build the Trans-Mongolian railway, and during the exchange of diplomatic correspondence arising out of Russia's opposition to the construction of the Chinchow-Aigun line, Russia actually proposed the Kalgan-Kiakhta line as a compromise. After her experience with the Chinese-Eastern and South Manchurian railways, the Chinese Government has however invariably declined to listen to any further overtures from that Power for railway concessions.

Russia's rejection of the neutralization plan for the Manchurian railways, as proposed by the American Secretary of State Mr. Knox, and her uncompromising opposition to the construction of the Chinchow-Aigun line, supplemented by her further protests against certain clauses of the Currency Reform Loan, have all had the effect of stiffening China's backbone against ceding her any further railway privileges. Every attempt on the part of China to develop Mongolia, and strengthen her position in Northern Manchuria, has met with the antagonism of Russia. When the Government of the latter Power served notice on China, that she could not construct the Chinchow-Aigun railway, a line within the confines o her own territory, because it would menace Russia's strategical position on the Amur, she disclosed to the world her true position *vis-a-vis* China.

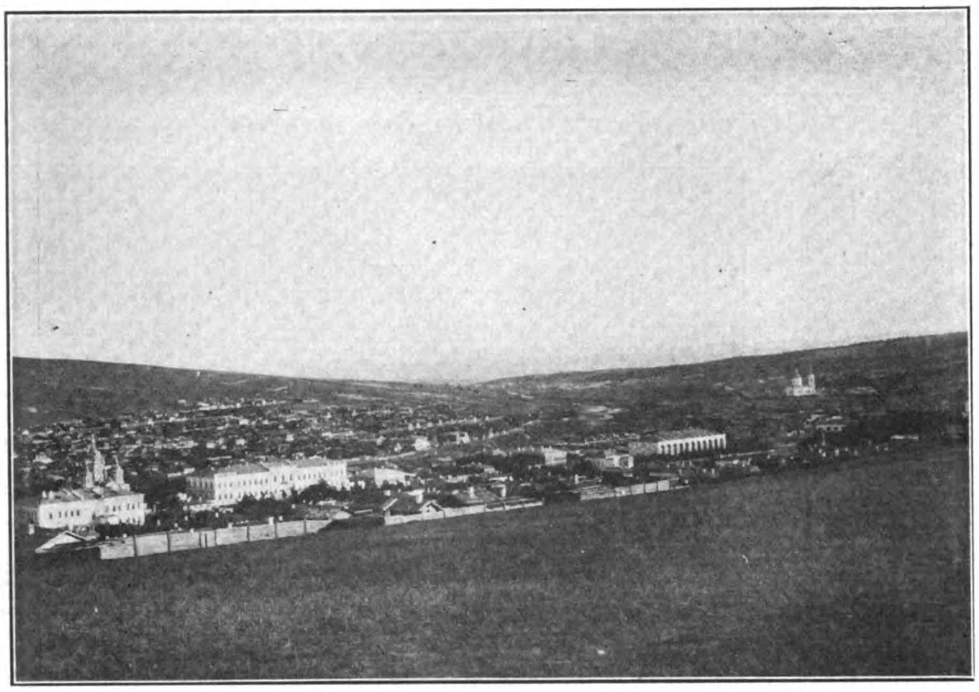
Notwithstanding that Russia had exercised her undeniable rights to build strategic railways in Siberia and Central Asia, paralleling China's Mongolian border, and terminating within striking distance of Kashgar, and projected lines were aimed at Kobdo and Urga, China was not be permitted to make a move to checkmate these advances, and defend her commercial interests or strategic position. Russia's opposition to the Chinchow Aigun railway was the most arrogant abuse of power that the world has witnessed in many years, and clearly foreshadowed her present tactics and actions in regard to Mongolia and Northern Manchuria.

It had become a sort of set national policy on the part of the old Manchu government to prevent at all hazards the control of the approach to Peking by the Kalgan railway, falling into the hands of Russia, and during the loan negotiations of last winter when this railway was offered as security for a small loan to an American syndicate, this point was

CARAVAN TEA IN STORAGE OUTSIDE URGA



THE MARKET AT URGA



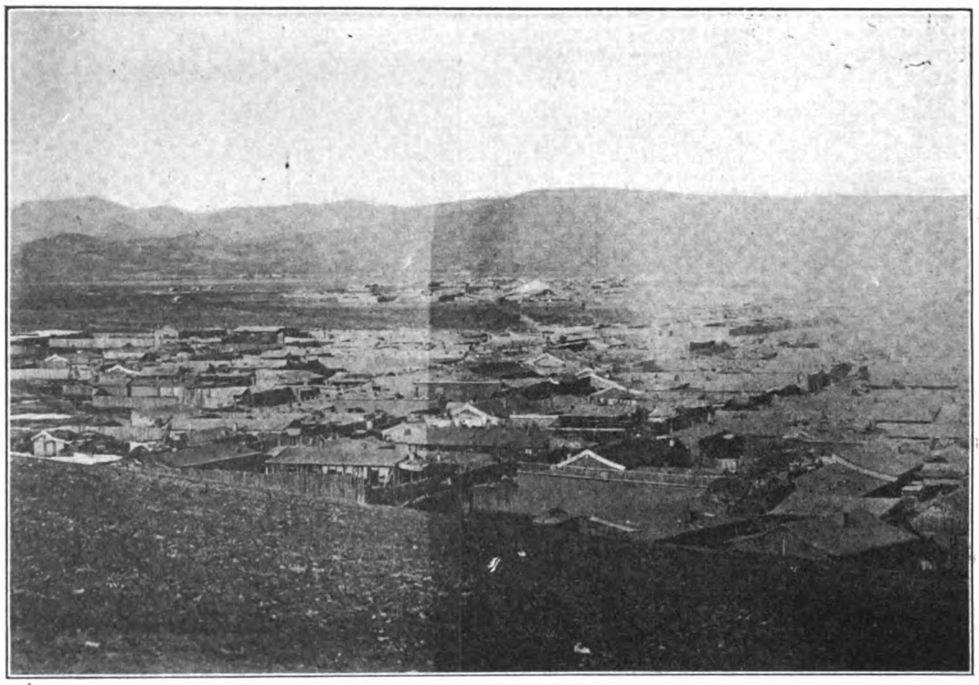
KIAHKTA

gone her one better, and when she found that it was impossible to obtain from the Chinese Government the coveted railway, mining and commercial rights in Mongolia, she availed herself of the situation caused by the general revolution by indirectly aiding a counter revolution in Mongolia, and recognizing the independence of the latter dependency. Russian newspapers are now publishing reports of negotiations with the new Mongolian government for railway and other concessions. Russia has served emphatic notice on the new Chinese Republican Government that she will not tolerate the dispatch of any armed force into Mongolia, to restore the dependency to its old allegiance. In other words Mongolia, is from now on to be considered as an independent state, and whatever concessions are secured from the Mongolian Government at Urga, must therefore hold good.

Russia is the only Power, which recognizes the independence of Mongolia, and has indoubtedly made it part of the bargain that she be granted a monopoly of railway and undustrial concessions. And which nation is in a position to seriously protest against this open attack on the integrity of China? Great Britain by reason of her understanding with Russia and Japan will hardly raise her voice in opposition to the arrangements, and in self defence will be compelled to strengthen her

emphasized. It came with great surprise, especially to Americans, that the new officials had overturned the traditions of the old regime, by pledging the Kalgan Railway as security for a loan with a Belgian syndicate, in which a Russian Bank had a large interest. The cancellation of the now famous Belgian loan, again postponed Russia's chance of controlling the Kalgan road to Peking, but to believe that she would tamely submit to the thwarting of her pet policy, is to overlook all her past history. What could not be obtained peaceably through diplomatic channels might be hooked by more indirect methods.

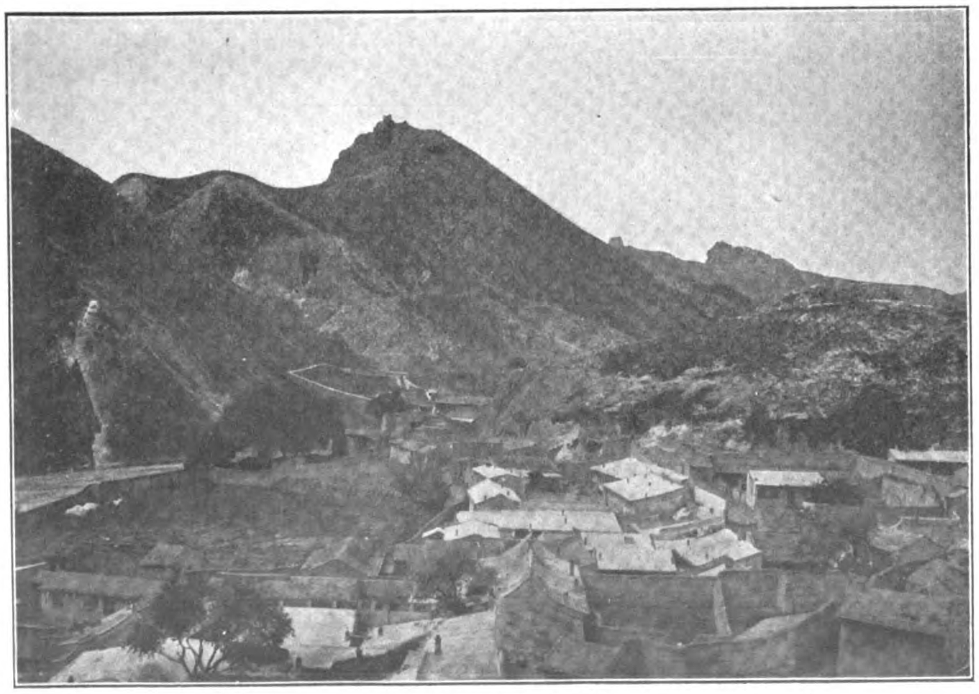
When the United States finally withdrew from the protracted and unsuccessful negotiations with the Republic of Columbia for the purchase of the Panama Canal strip, the state of Panama revolted and seceded from Columbia and declared its independence. America immediately recognized the new government, and then opened the negotiations resulting in the purchase of the present Canal Zone. America little thought that it had created a precedent, that might be invoked by other Powers in other parts of the world, to justify the acquisition of concessions considered vital to their national expansion. It would seem that Russia profiting by the lesson taught by America, has



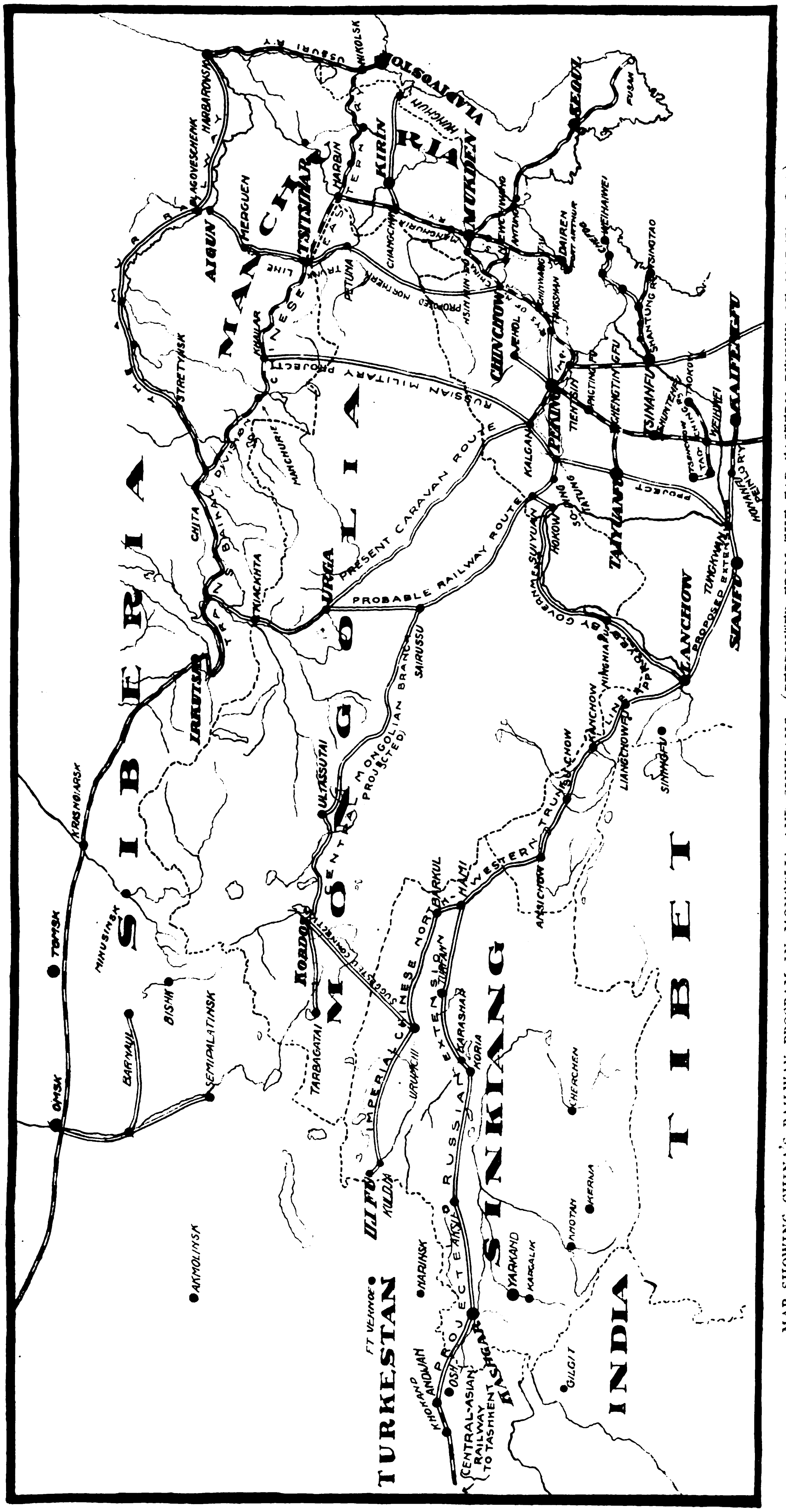
URGA

interests in Tibet. Germany cannot afford to divert her attention from the North Sea, France has the same interests in Yunnan as Russia has in Mongolia, and being her ally and banker would hardly oppose her schemes in Mongolia, and America whose moral support might have benefited China, is debarred from protesting against a situation which had the Panama Canal episode as a precedent.

It would appear that Russia has now a clear field, and can prosecute her policy of Mongolian commercial expansion without serious opposition. And what are the first fruits of the policy? Russian newspapers are full of a great scheme to link Moscow with Peking by means of a new railway through Mongolian territory, and add that the Russian Premier has promised to guarantee the interest on the capital needed for its construction. This without consulting China's wishes, proclaims to the world that Russia now arrogates to herself the sole right to construct railways through Mongolia and by the act of guaranteeing the interest on the cost of these lines foreshadows her ultimate annexation of the territory.



KALGAN



MAP SHOWING CHINA'S RAILWAY PROGRAM IN MONGOLIA AND SINKIANG, (REPRINTED FROM THE FAR EASTERN REVIEW OF MARCH, 1910)

There are two projects for the construction of the railway. One revives the old and much talked of Trans-Mongolia line from one of the stations of the Trans-Baikal railway through Kiakhta and Urga to Kalgan, connecting there with the Chinese Government railway to Peking. This line would be about 1,200 Russian miles long and the most feasible and economical one to construct.

The second project or the southern line, provides for an entirely new construction. Starting from Moscow the line will reach Semipalachensk, via Suizuran, Samala and Orenburg and running eastward from Semipalachensk, taking a course parallel with north latitude 50, will reach Urga the Mongolian Capital and, traversing the Mongolian plain, to Kalgan. The construction of the line involves great difficulties and immense expense, it being necessary to develop a new route in the waste lands of the Gobi desert. It is also necessary to construct a new trunk line between Moscow and Semipalachensk utilizing a portion of the Orenburg-Tashkend Railway. That line alone extends for about 2,500 (Russian) miles, about one-third of the entire mileage between Moscow and Peking. In addition the line between Semipalachensk and Urga covers 3,000 (Russian) miles and would then have to connect with the first project from Kiakhta to Kalgan another 1,200 (Russian) miles.

It would appear from Russian press reports that American, French and German financiers are ready to construct the lines and have opened negotiations with the Russian Government to this end. Like many of the new Russian railways they are not expected to pay for many years to come, and must be constructed under a government guarantee. The Russian official railway programme includes the following lines in Asiatic Russia, which are to be built as soon as the money can be secured.

Petropavlovsk-Akmolinsk, 885 miles; Spassk-Spaskiyzovod, 440: Spaskiyzovod-Station to Mondibay, 586: Kokchetav-Kurgon 260; Orsk-Troitsk, 280: Barnaul-Urga, 1,200: branch to Kuznetsk, 106: Minusink-Otchinsk 266: Krasiniarsk, 300: Birsk-Kuztesk-Minisink, 380: connection of the Lena River with the Siberian Railway at Ust-Kutsk Station, 466 miles. It will be noted that most of these lines tighten Russia's grip in Mongolia, and strengthen her strategical position with China.

Russian opinion is not unanimous in favouring the construction of the Mongolian projects, and there are those who violently oppose the much advertised Kiakhta-Kalgan line.

It is urged by the opponents of the scheme that both the projected lines would be disadvantageous to Russia from political and economic standpoints, because the Kalgan-Urga railway would prove a channel by which Chinese emigrants, as well as Chinese troops in case of war, could be brought to North Mongolia to the very frontier of Russia, and thus would become a base for a Chinese army operating against Russia. For that reason the Chinese Government has been greatly interested in this project for a long time and has partly assisted it by the construction of the Peking-Kalgan line. The construction of either of the lines moreover would be detrimental to Russian commercial interests. The Kalgan-Urga-Kiakhta railway would kill all the Russian railways east of Baikal, and would enable Chinese and foreign goods to be brought to North Mongolia at low freight rates. As to the second line through Orenburg and Semipalachensk it would be even more disadvantageous than the former, because by this railway all passengers would go from the Far East to Europe and vice-versa, and thus it would kill the Trunk Siberian railway in this respect, because it is much shorter than the latter.

Those who hold this opinion, however; are manifestly in the minority and belong to the anti-expansion element. Russia needs Mongolia, and has taken the first step towards the annexation of the territory. There is no other interpretation to the trend of events.

THE KWANGTUNG SECTION OF THE YUEH-HAN OR CANTON-HANKOW RAILWAY

There is renewed activity in building the Canton-Hankow railway line northward. This line, which will connect Hongkong with central China, is operating to Lai T'ang, a small village little more than a sand heap, 67 miles from Canton. Grading and bridging up to mile 79 is practically completed, but grading between there and mile 85 is backward because of objections from natives. Bridging and grading up to mile 112 is practically complete. Work between mile 130 and mile 140 is in progress and that on the section up to 180 is being rapidly advanced.

The Kwangtung Mercantile Administration of the Yueh-Han Railway Co. (Ltd.), a corporation of merchants, was organized with the assistance of the provincial government about six years ago to take over the line as originally projected. Its capital was $40,000,000 Canton currency (at present worth about 48 cents to the Canton dollar) for constructing that portion of the great through Canton-Hankow system which lies in the Province of Kwangtung, the portions of this through system in Hupeh Province south of the Yangtze and in Hunan Province being in the control of provincial companies organized to construct the lines therein. The shares in the Kwangtung company were placed at $5 local currency each, and it was agreed, and has materially been adhered to, that only stockholders would be employed in building and operating the line. This company, under direction and more or less control of the provincial government, raised considerable money by stock subscription and placing a loan on the line already constructed. The latter was financially successful, and in spite of financial demoralization and many drawbacks trackage was considerably extended.

Plans for Completing the Line.—The disturbances attending the announcement of the Government's policy of Government ownership of trunk lines a year ago, however, stopped work upon the road entirely. The general uncertainty attending the future of railways also rendered it unwise to proceed with construction. Above all, the railway had used about all the funds available. Later the revolution came on and still later there was considerable disagreement as to administration of the line. Lack of funds has prevented general advancement during the current year.

Apparently the provincial authorities and present management of the company have determined that the stockholders shall complete the line as far as possible with the balance due on subscriptions and have decided to call for payment of a third installment on the stock. Co-operation is indicated in a letter sent by Governor General Hu Han-ming to the president of the company stating that there has been great delay in completing the railway as a result of many difficulties and urging that there be no further delay in making the call for this third stock payment. What this will net the company is doubtful. Par value of shares is $5 silver. The first installment collected in 1907 was $1 silver, which netted, including interest on capital placed in loans and other assets, $8,888,093 local currency, or more than the face value of the installment on the stock. The second installment, collected in 1909, called for $1.50 local currency per share, which netted $10,849,512 local currency instead of the $12,000,000, the full stock issued called for.

Third Installment Insufficient—Loan Planned—Financial Statement.—The proposed third installment of the subscriptions of stock called for is the remaining $2.50 local currency per share, which would net $20,000,000 local currency if the full amount were realized. Opposition to the call for the installment is serious, however, and it is believed that nothing like the full amount called for can be realized, while even the entire amount would hardly complete the work and meet all liabilities. The company, therefore, has sought loans, which doubtless can be had when things in China again become normal and the exact legal and political status of the company can be established. Its financial position at the beginning of the current year, which is believed to be substantially that of the present time, is indicated in the statement, on page 179, in local currency, of receipts and expenditures from 1907 to January, 1912:

At the time of this financial statement it was officially reported by the management that the state of the lines of the company was as follows: Open to traffic, 49.7 miles; under construction, 63.8 miles; with rails laid but still unopened to traffic, 6 miles; already surveyed and located, 60 miles; yet to be located, 30 miles; total, 209.5 miles.

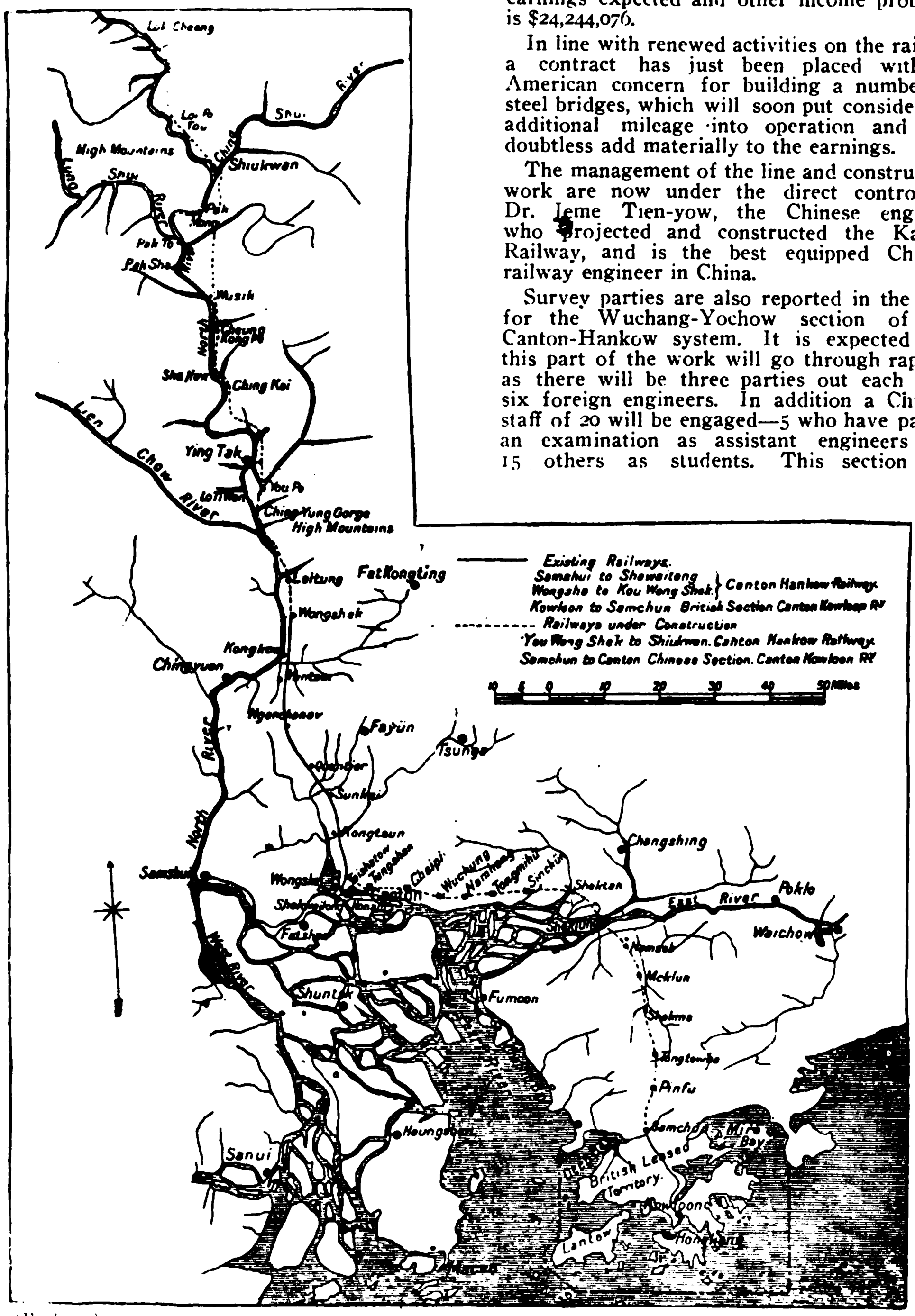
It was also estimated at the time that the entire line from Wongsha to Ping Shek could be completed within four years from 1912 at an estimated cost of $19,600,000, local currency, of which the balance on hand of $944,824, materials in stock worth $1,400,000, and receipts to be realized from traffic and interest amounting to $1,400,000 would form a part, leaving $15,855,276 still needed for the main line.

Branch Lines—Bridge Order—In addition to expenditures necessary for completing the main line, the company must necessarily construct two branch lines to connect it with the Canton-Kowloon line and the Sunning Railway extension. The first—about 4 miles long—is estimated to cost $302,400, the second branch, of about 50 miles, $8,086,400 local currency. The total amount needed for completing the system in Kwangtung Province, allowing for earnings expected and other income probable, is $24,244,076.

In line with renewed activities on the railway a contract has just been placed with an American concern for building a number of steel bridges, which will soon put considerable additional mileage into operation and will doubtless add materially to the earnings.

The management of the line and construction work are now under the direct control of Dr. Jeme Tien-yow, the Chinese engineer who projected and constructed the Kalgan Railway, and is the best equipped Chinese railway engineer in China.

Survey parties are also reported in the field for the Wuchang-Yochow section of the Canton-Hankow system. It is expected that this part of the work will go through rapidly, as there will be three parties out each with six foreign engineers. In addition a Chinese staff of 20 will be engaged—5 who have passed an examination as assistant engineers and 15 others as students. This section will



(Engineer) MAP OF THE KWANGTUNG YUEH-HAN RAILWAY

Year	Receipts	Amount	Expenditures	Amount
1907	$1 per share from call of first installment of total shares valued $ 5 each	$ 8,888,093	Payments for the resumption of this line from the American Development Co. for salaries of workmen and officials and purchase of materials, etc., from 1907 to 1911	$21,979,559
1909	$1.50 per share from call of second installment up to eighth moon of 1911	10,849,512	Accounts still outstanding...	79,800
1907–1911	From traffic and interest on share capital and other sources	4,096,778	Sixth installment of resumption loan	616,000
			Miscellaneous	214,200
	Total	23,834,383	Total	22,889,559
			Balance	944,824

connect with the Kwangtung section at the border of Hunan Province. Starting these survey parties is further indication of a determination to push the railway enterprise forward. (Consul General Geo. E. Anderson, Hongkong) a fuller technical report on this railway appeared in the December, 1911, issue of this paper).

PHILIPPINE RAILROADS

The somewhat belated Report of the Philippine Commission for the fiscal year ending June 1911, has just been received from Washington. The Governor General says:—

Railroad construction has progressed steadily during the year. The Philippine Railway Co. have in a large measure completed their work. The total mileage for which immediate construction is expected is now in operation and showing handsome increases. The line in Panay has shown its peculiar importance, as the country which it traverses was almost abandoned, but is now being planted with various crops, particularly sugar.

The Manila Railroad Co., operating on the island of Luzon exclusively, is rapidly pushing the construction of its southern branches. At the present writing the line has just reached the town of Batangas, the town of Tiaong in Tayabas, and almost to the town of Magdalena in La Laguna. The sections opened up have proved unexpectedly productive, and the business of the railroad has been immediate. The Province of Batangas shipped out 10,000 tons of oranges the first year that the railroad went in. The unguaranteed section of the line is being pushed rapidly to the north and is now in the town of Aringay. Surveys have progressed rapidly, and the railroad has found a satisfactory line at reasonable grade to the city of Baguio.

In the main, the railroad situation looks encouraging, and the stimulus given to industry and the additional activity and progress among the people benefited has justified the Government in the assistance which it has given in the matter of inducing the construction of railroads.

The total kilometerage of railway lines authorized by law, with the length constructed, to be constructed, and in operation on June 30, 1911, is shown below:

Road.	Authorized.	Constructed, in operation.	Constructed, not in operation.	To be constructed.
Manila R.R. Co.	*1,327.7	620.7	51.1	*655.9
Manila Electric R. R. & Light Co.	48.7	41.2	....	7.5
Manila Suburban Rys. Co.	19.9	9.9	....	10.0
Tarlac Ry. Co.	20.6	20.6	....	....
Daet Tramway Co	7.2	7.2	....	....
Philippine Ry. Co.	368.6	211.9	....	156.7
Insular Coal Co.	12.0	12.0	....	....

*Approximate.

Manila Railroad Company.

Construction.—During the year 89.6 kilometers of track were laid by this company, the average required to complete guaranteed lines under legislative concessions by September 12, 1918, being 90 kilometers annually.

Operation, northern lines.—On the northern lines 441.3 kilometers of main track were in operation on June 30, 1911. The results of operation for the calendar years 1909 and 1910 follow:

	1909	1910	Increase.
Average operated kilometerage for which operating results are shown	342.7	409.1	66.4
	P	P	P
Revenue from transportation	2,035,025.75	2,452,730.21	417,704.46
Revenue from operation other than transportation	12,597.95	14,857.09	2,259.14
Operating expenses	900,779.79	1,072,974.47	172,194.68
Taxes	10,238.09	20,213.28	9,975.19
Operating income	1,136,605.82	1,401,597.85	264,992.03

Miscellaneous income, including income from separately operated properties, interest on securities, loans and accounts, etc., of which no report is obtainable for 1909, increased the operating income for the year 1910 to a gross total of P1,699,110.05.

The year 1910 was unusually free from severe storms, and but few interruptions to traffic were caused by washouts.

Operation, southern lines.—The average kilometerage operated during the year 1910 on the southern lines was 111.8, and the results of operation for the calendar year follow. No report is available for the previous year:

Revenue from transportation.. ..	P201,523.39
Revenue from operation other than transportation	346.34
Revenue from outside operations..	658.54
Operating expenses	134,459.02
Taxes	1,574.74
Operating income	66,494.51

Philippine Railway Co.

CONSTRUCTION.

Island of Cebu.—At the end of the fiscal year there were a few items of construction work unfinished, the majority of which were, under a ruling of the Governor General, required to be finished by August 1, 1911, two items running to October 1, 1911. No construction work has been done on the proposed line from Carcar across the island to Barili and Dumanjug.

Island of Panay.—During the year the construction forces have been engaged in completing the grade, ballasting, bridges, etc., and at the end of the year 11.4 kilometers of final ballasting remained to be done, together with the wharves at Iloilo, several water stations, and a number of miscellaneous items.

OPERATION.

Island of Cebu.—The results of operation for the fiscal years 1910 and 1911 over the 95.6 kilometers of line on Cebu follow:

	Fiscal year		Increase.
	1910	1911	
	P	P	P
Revenue from transportation	236,435.84	272,168.11	35,732.27
Revenue from operation other than transportation	1,320.56	13,606.93	12,286.37
Interest on bank balances	....	2,072.45	2,072.45
Operating expenses	197,415.26	198,150.65	735.39
Taxes	....	2,593.95	2,593.95
Net operating income.	40,341.14	87,102.89	46,761.75

Island of Panay.—The line on this island from Iloilo to Capiz has been in construction operation since September 1, 1910, the average kilometerage under operation during the year being 110.2. In the following table the average operated kilometerage for the fiscal year 1910 is 74.55, and for the fiscal year 1911, 110.2.

	Fiscal year—		Increase.
	1910	1911	
	P	P	P
Total revenue	146,188.60	273,533.82	127,345.22
Operating expenses	111,180.43	151,420.35	60,239.92
Operating income	35,008.17	102,113.47	67,105.30

Manila Electric Railroad & Light Co.

	Fiscal year—		Increase.
	1910	1911	
Kilometerage of lines in operation	63.2	64.7	1.5
	P	P	P
Operating revenue	1,124,612.31	1,244,048.35	119,436.04
Operating expenses	606,211.34	641,839.86	35,628.52
Operating income	518,400.97	602,208.49	83,807.52

Manila Suburban Railways Co.

	Fiscal year—		Increase.
	1910	1911	
Kilometerage of lines in operation	11.6	11.6	....
	P	P	P
Operating revenue	215,670.40	251,563.03	35,892.63
Operating expenses	123,441.22	116,348.18	*7,093.94
Operating income	92,229.18	135,214.85	42,985.67

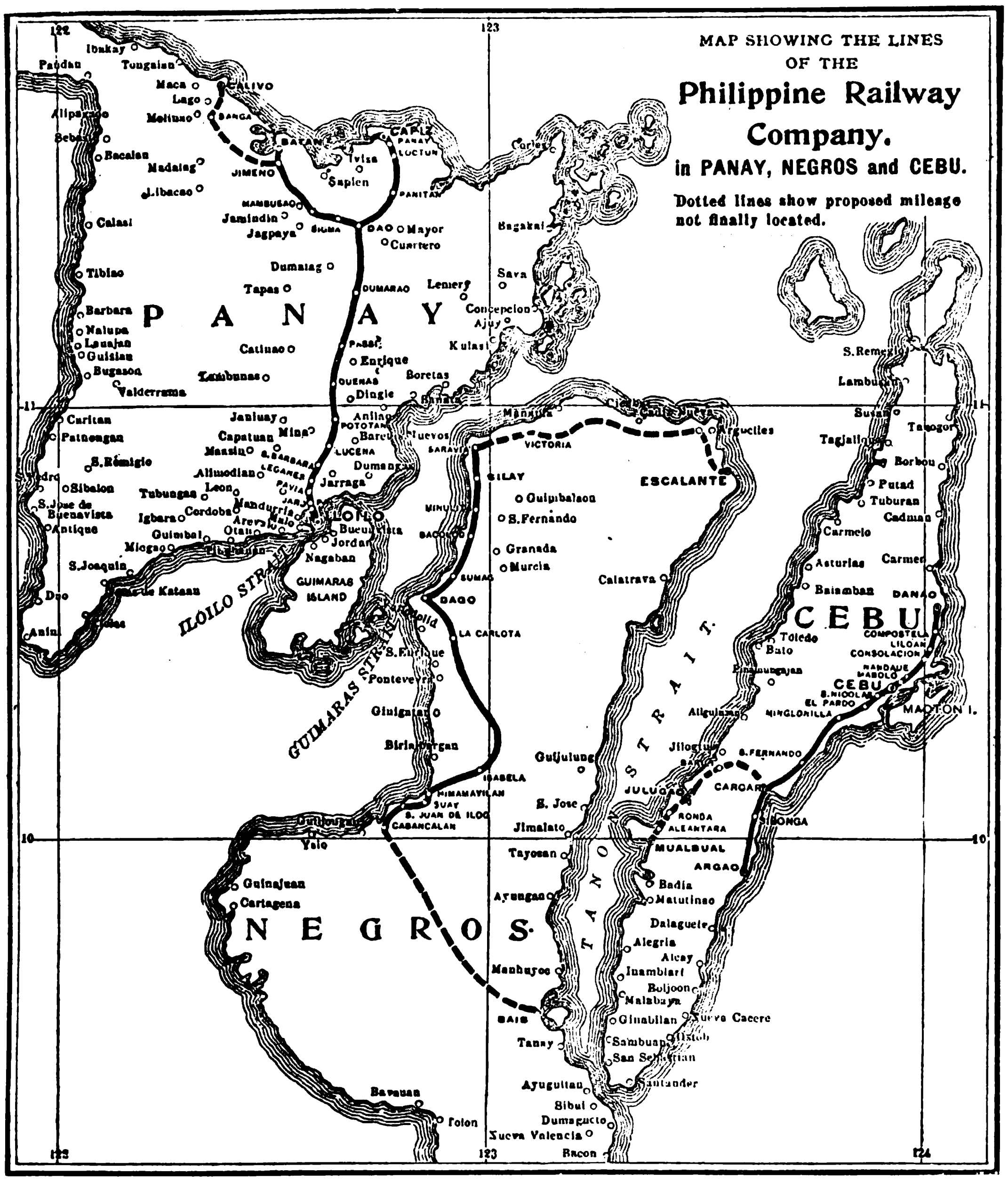
*Decrease.

Daet Tramway Co.

The Daet Tramway Co., operating over 7.24 kilometers between Daet and Mercedes, in the Province of Ambos Camarines, reports a total revenue from passengers, freight, and mails of P17,369.19, with operating expenses, including maintenance and taxes, of P12,528.75, leaving an operating income for the year of P4,840.44. The equipment of this short line consisted of 4 passenger cars and 20 freight cars, operated by 22 bulls.

Tarlac Railway Co.

The Tarlac Railway Co., operated entirely by the use of Manila Railroad Co. equipment, under contract with that company, between the towns of Paniqui and Camiling, a distance of



20.58 kilometers, in the Province of Tarlac, reports as follows on the results of operation during the fiscal year 1911:

Total revenue..	P33,384.30
Operating expenses	15,886.12
Taxes	1,612.16
Operating income	15,886.12

THE MANILA RAILWAY COMPANY

GRATIFYING RECORD FOR 1911

A highly satisfactory record for the past year and well founded expectations of still greater success in the future were the chief features of the address delivered by Mr. C. Cater-Scott, Chairman of the Manila Railway Company (1906) Ltd., at the fifth annual general meeting of the company held in London on July 23.

The Chairman said that the accounts showed a distinct step forward. All debenture charges had been met out of revenue, nothing had been charged to capital, although such procedure was quite legitimate when a great deal of construction work was proceeding. There still remained a balance and from that they proposed to pay a dividend of one per cent on the Preference stock and to carry forward an amount equivalent to three per cent on the Preference stock. The directors had adopted this conservative policy as they wished to avoid the possibility of a set-back, they did not want to declare a dividend of two per cent one year, and then perhaps go back to 1 per cent the next year.

THE RAILWAY RETURNS.

With regard to the railways, on groups 1 and 2 of 217 miles, consisting of the old Manila-Dagupan line, with the first extensions the old company built, on the same mileage as in 1910 the gross traffic had risen P355,000 to P2,633,000. The working expenses ratio was 41 per cent., as against 40 per cent., but in 1911 the rainfall had been extraordinary, with heavy floods and washouts. On these two groups the net revenue was P1,550,000 or P122,000 more than in 1910, and P404,000 more than in 1909, so that in two years the net revenue from these groups had increased by over £40,000, while the earnings per mile of road, which in 1909 were £528 and 1910 £658, in 1911 amounted to £714. In group 3, consisting of the extension from Dagupan to near San Fernando, with some small feeder branches, in 1910 there was a loss of P41,284 but last year the loss was reduced to P13,060 and in the current year he thought there would probably be some profit, because last year the expenses of working the group were increased, through the heavy washouts, by considerably more than the amount of the loss. Moreover, even if a feeder sometimes did not actually pay its way, it benefited the main line. For instance, in connection with group 3, traffic amounting to P222,000 was brought to the main line in 1911, which was a fair *quid pro quo* for the small loss sustained on its operation. On the Southern system they operated an average of 72 miles in 1911, against 60 miles in 1910. The credit balance resulting was P409,000 or over £40,000, as against P67,410 or £6,700 in 1910. The earnings per mile of road had increased in the year from £112 to £568. The American Company (the Manila Railroad Company of New York) in 1911 earned not only all the interest on the Southern Guaranteed bonds, £23,000—so that there was no necessity to go to the Government for any portion of the guarantee—but they had a surplus of £13,000. They were able to meet the interest on the bonds held by the English company, to pay off £31,391 of accumulated arrears of interest, and to carry forward an undivided balance of £6,235.

BRITISH COMPANY'S POSITION.

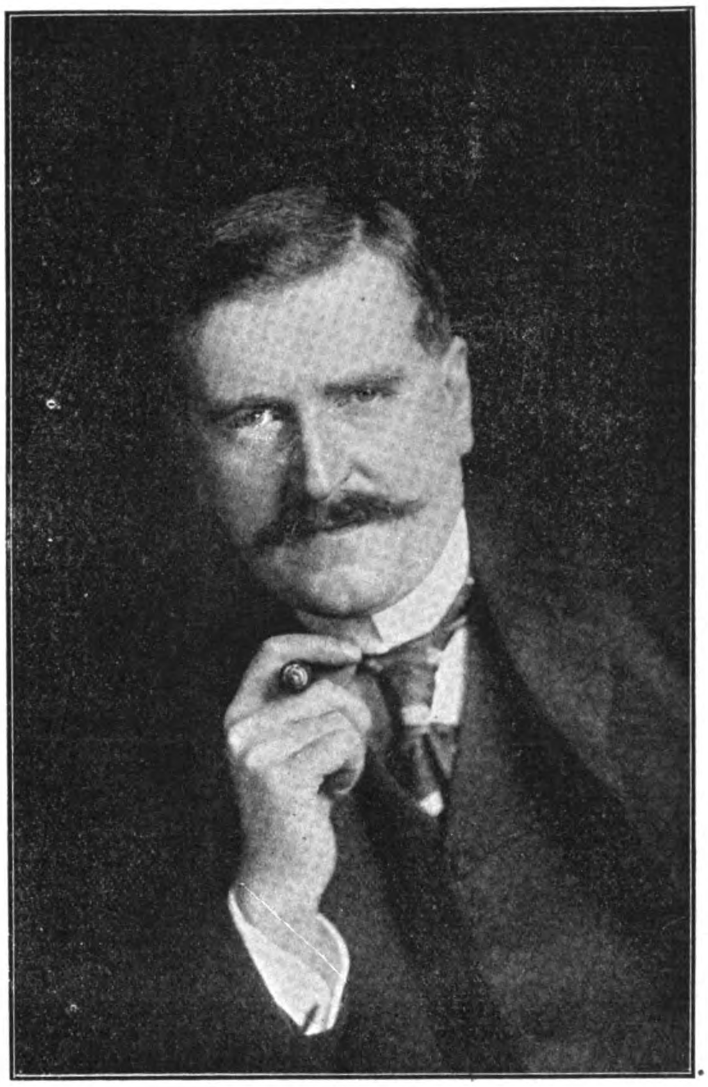
The receipts of the British Company in the past year were £197,332, which, after paying London expenses, interest, &c., left a balance of £190,640, or, with the balance brought forward, £235,577. The payment of the full interest on the "A" and "B" bonds absorbed £155,200; the proposed 1 per cent. dividend on the preference shares would take £20,000, and £60,377 would remain to be carried forward. They could honestly congratulate themselves on these results, and could look forward to the future with considerable confidence. The Northern system, when completed, would be 370 miles, of which 295 miles were completed and in operation, 35 miles partially completed, and on 40 miles work had not yet been commenced. It would not be long before the construction of the Northern system was complete. In the south the total mileage was estimated at 470 miles, of which 158 miles were completed and in operation, 42 miles partially complete, and 270 miles had yet to be built. Altogether they had 453 miles complete, 48 miles partially complete, and 330 miles yet to be built, making a grand total of 840 miles. In the south they were building a line something like a herring-bone from what might be called the civilised part of the island to the south, and they hoped gradually to put out feeders, and eventually cover the entire island with a network of lines. This they believed would lead to great prosperity; but they must go slowly, husbanding their resources as much as they possibly could. From the "Merchant Association Review" of Manila, the chairman then read an extract showing that in this direction the railway was opening up a hitherto unsuspected volume of products which had gone ungathered for years through lack of transportation. Some of the shareholders were anxious that the northern system should be completed at once, but they must be guided by what the Government desired, and it was the wish of the Government that they should push on construction in the south with all speed. It was in the interests of the shareholders that the working capital should be employed in the first place where it would be most advantageous to the company in opening up the trade of the island and in affording facilities not only for the traffic which existed but for developing it more and more.

THE BAGUIO LINE

The Chairman continued that the Government had long been anxious for them to build a line to Baguio, "the Simla of the Philippines," but the company had found themselves unable to follow the route which had been chosen for the Government's own line. After a great deal of difficulty they had been able to find what looked like a suitable line to Baguio. He proceeded: The route we have selected is from Aringay, on the coast, and then for about 12 miles it goes to a place called Galiano, and from thence up to Baguio. We have adopted the system, which is very largely used in Switzerland and other mountainous places, called the rack railway. As our staff in the Philippine Islands had no experience of rack railways, and in order to prevent any

misfortune or undue cost, we arranged with Mr. Spinnler, who is a Swiss railway expert and who has had charge of a good many mountain railways, to go out and report. Well, Mr. Spinnler has gone out and he has reported. He approves of the location we have selected for the railway, and I think we shall be able to secure his services to see that it is built thoroughly in accordance with the best and most up-to-date rack railway system. I do not think that next year we shall be able to report that the line is finished, but in two years' time I, myself, or whoever then is in the chair, will be able to tell you that the road is through to Baguio, that we have the line working satisfactorily, and that we have been able to do everything to meet the wishes of the Government of the Philippines. And here I should like to say that we do feel we owe the Philippine Government a great deal for the way they have consistently endeavoured to help forward all our railway construction. Only one more word in conclusion, for I am sure you would like to know what progress we have made this year with construction. Well, from January 1 to July 18 we opened for traffic practically 28 miles. Of course, there is a great deal more work done, and before the end of the year we shall quite fulfil our contract with the Government. I now beg to move that the report and accounts be adopted.

Admiral Sir Cyprian A. G. Bridge seconded the resolution.



HORACE L. HIGGINS,
PRESIDENT AND GENERAL MANAGER,
MANILA RAILWAY CO., LTD.

COMPLETION OF CONSTRUCTION

In reply to a question the Chairman said that the company had never owned the Paniqui-Camiling line; it had operated it for the owners taking a certain portion of the receipts but when it was found not to be good enough to continue the arrangement it was terminated. The company had a contract with the Philippine Commission to finish the construction work by the year 1918. So far, they were completely fulfilling their construction liabilities, and he saw no reason to fear that they would not be able to do so in the future. He would not like to prophesy as to what the receipts from their lines would be this year; for they had another six months to run before the year ended. However, the total earnings on the old part of the line—the 217 miles—and on the new system (group 3) and on the southern lines (group 4), had amounted to £262,000, as against £220,000 gross last year. With those figures before him he did not anticipate that they would do worse than they did last year, but he would not like to say how much better they might do. As he pointed out last year, the object of the board was to build up the undertaking to a position of a steady dividend-paying concern, and this was a policy which he considered to be in the best interests of the shareholders. As he had already pointed out, they did not want to pay a dividend of 2½ per cent. or 3 per cent. one year and then another year have to revert to the payment of 1 per cent. As he had also pointed out, they had big construction liability; they had certain parts of the road to build which might not prove to be as profitable as some other portions, and it was therefore necessary that the directors should proceed very carefully indeed. Not only had the directors considered the possibility of using water power, but Mr. Higgins had also considered the advisability of using electricity as motive power, though up to the present time nothing had been done.

The resolution was put to the meeting and carried unanimously.

The resolution declaring the dividend of one per cent on the preference stock was agreed to.

New Railway Bridge, India:—The Northwestern Railway bridge over the Malir River, some 12 miles from Karachi, is stated to have been condemned as unsafe. The Government is asked to sanction an expenditure of $455,000 for a new bridge capable of bearing a double track.

The Malir in the dry season contains no water, but on some occasions has a depth of 30 feet and a width of nearly 1 mile. The bridge at this point has been badly damaged by floods repeatedly, and on two occasions was practically rebuilt. The construction has been authorized and the work will be carried out under the supervision of the District Engineer of the Northwestern Railway, (Mr. A. P. Walsh) whose office is at Karachi.

THE TIENTSIN-PUKOW RAILWAY

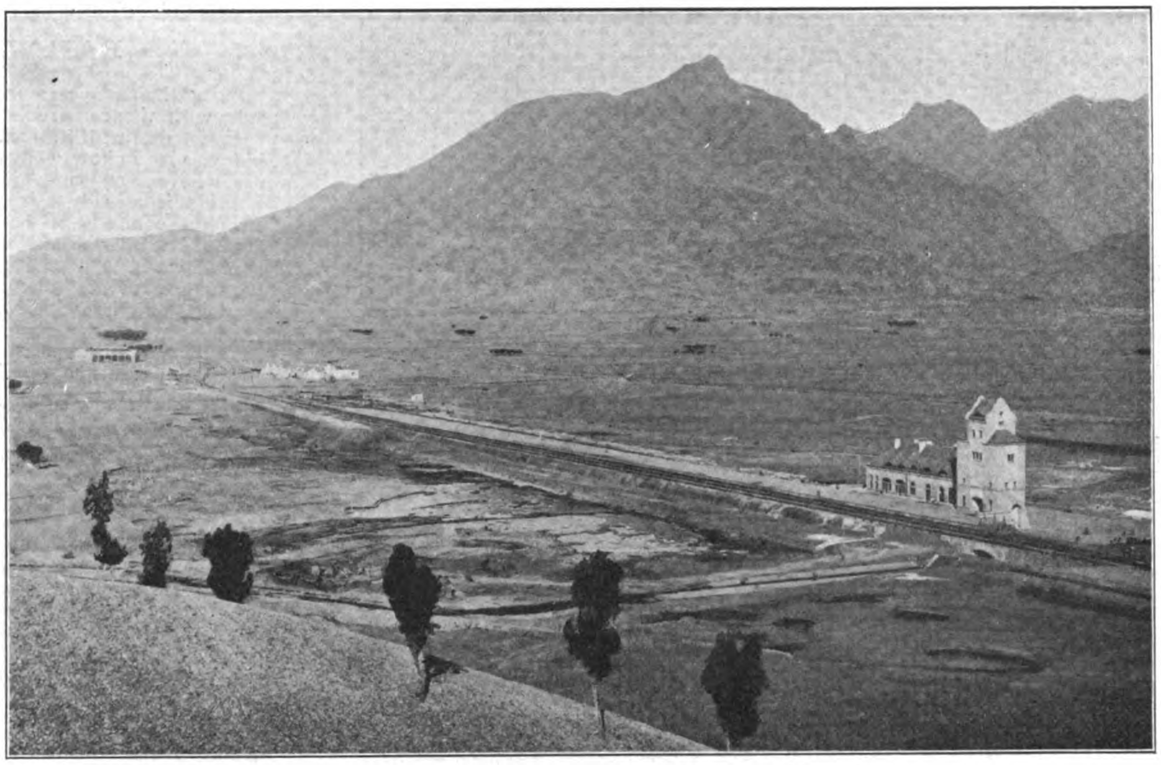
During the past year such progress has been made with the construction of the trunk line which is destined to connect Shanghai and Peking, via Pukow (on the Yangtsze River opposite Nanking) and Tientsin, that a service of trains is already available for passengers. Through connection between Pukow and Tientsin has not yet been made, the bridge over the Yellow River, near Tsinanfu, the capital of Shantung Province, being still uncompleted. The photographs which we publish on this page, and which were specially taken for the FAR EASTERN REVIEW illustrate the stage of construction reached on August 28 last. The approaches have already been completed and the central span, which is in course of building, is all that remains to be finished in order to effectively link Pukow with Peking, and, in fact, the extreme limits of all lines radiating from the Capital or its next door neighbor Tientsin.

It is hoped that by October or November the Yellow River bridge will be open for traffic, and then it may be said that through railway communication can be had between Shanghai, the metropolis of China on the Asiatic littoral, and Calais on the English Channel, or any large European port for that matter washed by the North Sea, the Atlantic, or the Mediterranean, the only break of rails of consequence being that at the Yangtsze River between Nanking and Pukow. There a passenger ferry will do service for some time, but the day will come when the cars despatched from Shanghai may be transported over on a modern train ferry, and, if it is so desired, be run to the limits of China if no further. Even now passengers may traverse the whole distance from Shanghai to Europe overland, the only objection to the journey just at the moment being the compulsory delays of one night each at Nanking, Hsuchowfu, and Tsinanfu, before Tientsin can be reached.

As is no doubt known to readers the line between Pukow in the south and Tientsin, in the north, is a stretch of miles connecting for through traffic the short lines which have for some time been open between Shanghai and Nanking (miles) on the one hand, and Tientsin and Peking (miles) on the other. The southern section of the main stretch that between Pukow and Hanchwang, on the Shantung border, and hard by the historic Grand Canal (which waterway, it may be parenthetically remarked also stretches from the Yangtsze, and from even further south in Chekiang Province, to Tientsin, connecting with Peking), was built with British capital and engineers, whilst the northern section from Hanchwang to Tientsin is the product of German capital and engineers, the former section being miles in length whilst the latter is

The present article in no sense aims at being a technical description of the line. That will be published later. It is merely a cursory report of the present progress of the work, embracing a little general information for the benefit of those desirous of knowing what travelling facilities at present exist. To accomplish that object in the easiest manner we will conduct the passenger northwards from Shanghai. Thus we embark upon the

First Stage. Leaving Shanghai on the well appointed and conducted limited express of the Shanghai-Nanking Railway at 1.5 p.m., after having purchased either a first class ticket for $, a 2nd class one for $, or a 3rd class one for $, as best suits the taste or the pocket, the traveller is borne through entrancingly interesting and intensely cultivated country until Nanking is reached at p.m. The Bridge House Hotel, newly renovated and well conducted, will afford dinner, accommodation for the night and early breakfast at reasonable rates and will see to it that baggage is aboard the launch which leaves at 6.30 a.m. next morning to cross the river for Pukow—and in this apparently trifling matter it behoves the traveller to follow the example of his baggage for if he misses the launch he will be compelled to cross the river by sampan and perhaps miss his train, although it does not leave the other side of the river



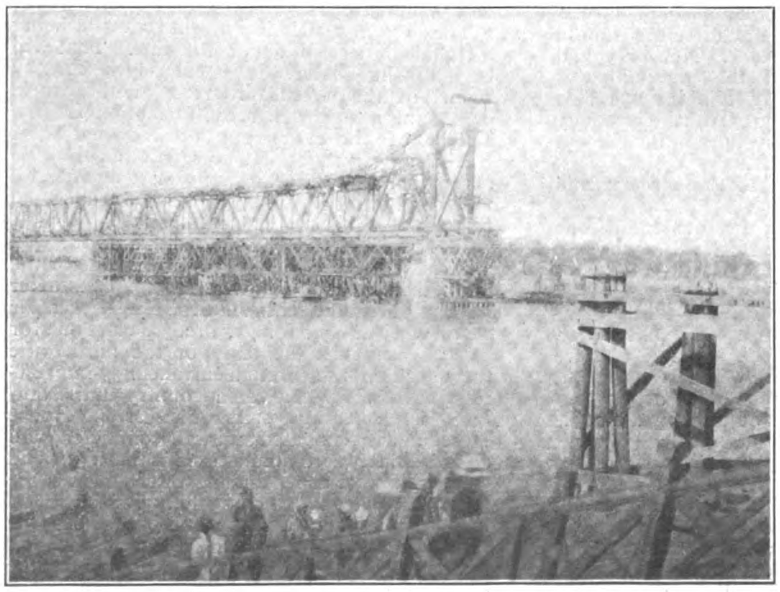
TIENTSIN-PUKOW RAILWAY, NORTHERN SECTION: THE STATION AT TAIANFU. TAISHAN, THE SACRED MOUNTAIN IN THE BACK GROUND

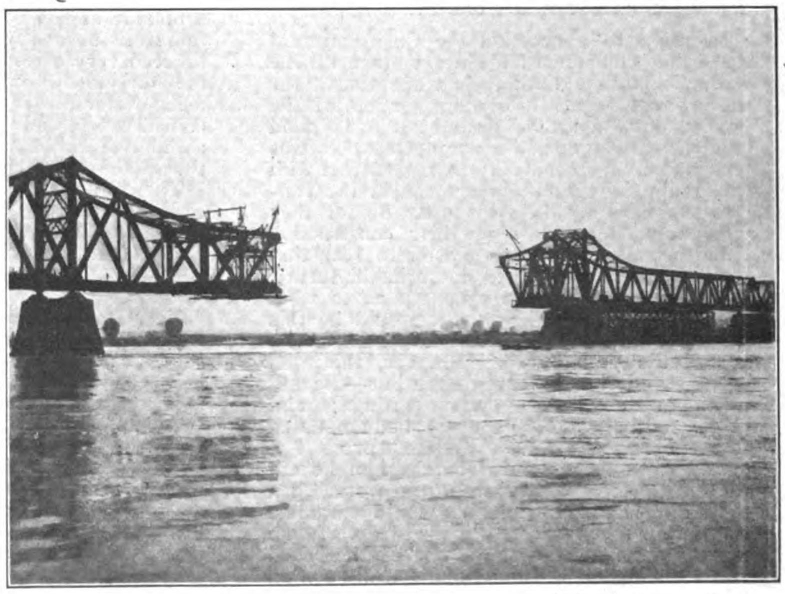
until 7.30. Here, in the dark of a chilly morning, the passenger may feel disposed to wonder why on earth he should be compelled to leave Nanking at 6.30 a.m. on a ten minutes' launch journey to catch a train departing at 7.30. This deponeth sayeth not, but surmises it is one of those little anomalies which seem to be contrived the world over for the mental delectation of the critical tourist. But it is so, and whilst wondering we enter upon the

Second Stage. With the arrival of the launch on the northern bank of the great turgid stream Pukow becomes alive with coolies hustling and jostling and exhibiting Sandow strength in the apparent endeavor to rend the baggage into infinitesimal fragments. They crave, one would think, the distinction of carrying it to the train standing at the platform a few hundred yards away, but the proud innocent may be disabused for they need the money. The Pukow coolie like unto more erudite men of different hue has learnt the bitter lesson that distinction is not convertible into any know currency of any realm sufficiently magnetic to attract rice from the keeper of the stores. But having suppressed the clamant demand by paying far in excess of the value of the service rendered, and having purchased at a galvanised iron shed (for the station is not yet built) a first class ticket for Hsuchowfu, some 211 miles to the north, for $12.65, a 2nd class one for $8.50, or a 3rd class one for $4.00 the traveller may board a substantial first, second, or third class car and make himself comfortable for a journey lasting till the sun sets.

It may be here intimated for the information of the stranger that the second and third class accommodation is mostly used by the Chinese, but the second class seats can be made endurable by the use of a cushion or a folded rug. The first-class car, divided into coupés and a wide-windowed easy-chaired smoking saloon, is all that one could desire for the distance or the money, and an additional attraction is attached to it in the shape of an up-to-date dining car, whereon excellent food is served at the modest price of $1 for a meal of several courses, the menu at the same time intimating that one bottle of aerated water is given gratis with each meal!

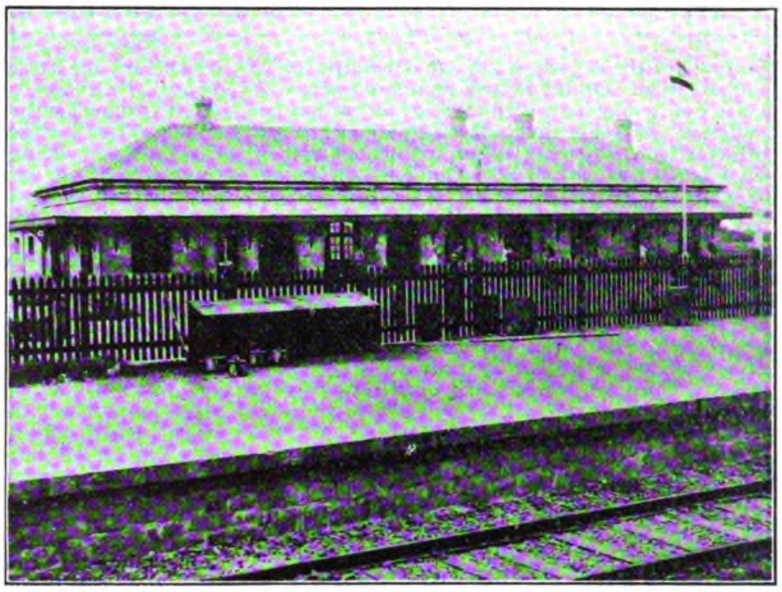
Before the traveller can make up his mind what kind of free liquid he will indulge in at his breakfast he is whirled past the well laid out work shops on the left, some distance from the station, and is carried through a cluster of low hills and undulating ground to the great plains stretching away into Shantung—cultivated to the last available inch, every mile of it. In August it was all aglow with green beans, millet, or sepia-crested kaoliang, with the monotony of still life being constantly broken by the interjection into the scheme of things of the ubiquitous donkey, or donkey cum bullock, or bullock cum two donkeys, or vice versa, at the plough or harrow. And in the midst of a Pickwickian rumination upon the strange mutability of human affairs that places the traveller in the train and the





TIENTSIN-PUKOW RAILWAY: THE YELLOW RIVER BRIDGE, SHOWING PROGRESS OF CONSTRUCTION

MAY 1912 AUGUST 28, 1912



STATION AT LIU HUAI KUAN — TIENTSIN-PUKOW RAILWAY. BRITISH OR SOUTHERN SECTION — STATION AT PENG-PU

sun-burned Chinaman, who used to hate the train, at the everlasting plough, a force armed with formidable rifles enters the car and makes demands of the passengers. One is prone to think that the days of Deadwood Dick, the famous hero of the Black Hills, have come to China, but it is not so. It is merely the collector of tickets and part of the train guard. We are still in the days of insecurity.

Gradually the train fares into the north through areas known for conflicts in the recent Revolution between the retreating soldiers of the Imperialists under Chang Chun and the Revolutionists. At Ling Huai Kwan station, near the Hwai River, notorious for its disastrous floods, still stand two four point seven guns as mementoes of the strife, whilst others still remain at Hsu Chow-fu. Shortly after passing Peng-up station the Hwai River is crossed, and here the largest bridge, though not the longest, on the line is crossed. It is of steel and is 1876 feet in length there being nine spans of 200 feet each. The country in this vicinity is flat alluvial and the crops are not good. The land is too subject to inundation to permit of good returns, but the industrious Chinese plough and sow, and risk the result. This year they will get returns, but the Hwai River has not been obstreperous.

Hsu Chow-fu is reached somewhere between seven and eight o'clock, and here the change is made to the cars of the German section. The train from Tsinanfu, in the north, arrives a little earlier than the southern train and the passenger bound northwards leaves the train upon which he has travelled, after taking

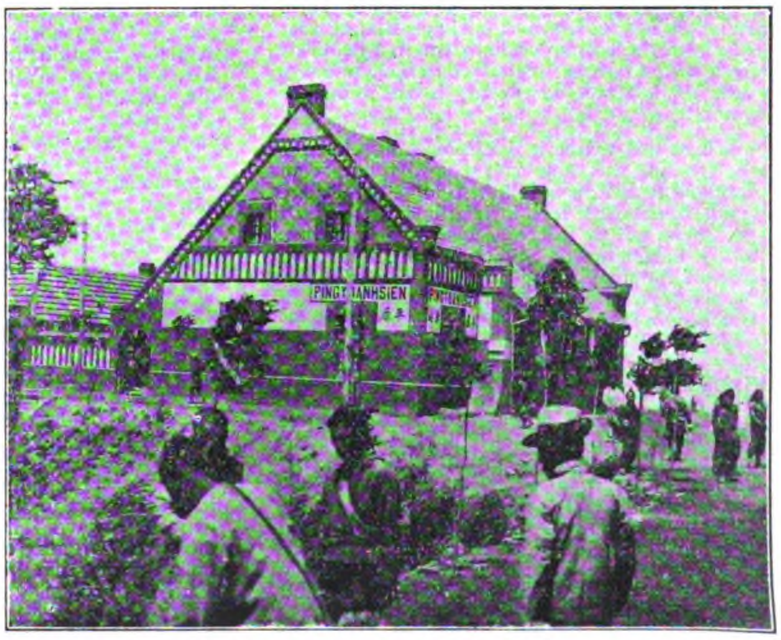
THE HWEI RIVER BRIDGE, ON SOUTHERN TIENTSIN-PUKOW RAILWAY (1,876 FEET IN LENGTH—9 SPANS OF 200 FEET)

dinner, of course, and boards the German train, where he sleeps the night. The first class cars of the German section are convertible into sleepers and so are as comfortable as could be wished. The next morning the traveller enters upon the

Third Stage.—At 7 a.m. the train starts upon its 200 mile journey for Tsinan-fu, the fares being $12.30, first class; $8.20, 2nd class and $4.10 3rd class. The cars are comfortable, though there is no dining car attached, the meals being cooked in what is called a kitchen and served in the coupés, though this method is awkward if there are several passengers, since there is but sufficient table space to accommodate the necessary gastronomical equipment for one person.

The valley in which the station stands was once the bed of the Yellow River. That great stream once rolled down between the hills, but now there is nothing but cultivation, and the erstwhile rush of waters would probably have been forgotten by now were it not that the great dykes of old still stand as reminders of the other time when China's Sorrow heeded their restraining influence.

About an hour after starting out the Grand Canal is crossed by the traveller for a second time, the first crossing being just prior to arrival at Chinkiang, on the Shanghai-Nanking Railway. Near Hanchwang it is a narrow and apparently well-kept waterway, emerging from a great lake along which the line skirts for some mile, and which stretches away west as far as the eye can reach. At Hanchwang the train is in Shantung and the architectural



TYPICAL STATION BUILDINGS ON THE GERMAN SECTION OF THE TIENTSIN-PUKOW RAILWAY

features of the railway station at once attracts the attention. On the British section no particular notice may have been taken of the railway stations. They are simple brick buildings constructed to one general design, corrugated iron roof and unostentatious. On the German section the eye is attracted by a variety of design and a show of architectural adornment that is striking and lavish. The buildings are variously of stone or brick with red tiled roofs, and the scheme of design at each individual station is carried through even to the water tower and the pointsmen's huts. It is all picturesque, and the German section will stand unique in China at least for its display of talent in the designs of the railway stations.

The country traversed gradually improves from the agricultural point of view, and is all heavily cultivated, though the crops vary in condition. Nearing Tsinanfu the famous sacred mountain of Taishan is passed, and the formation of the country changes till Tsinanfu is passed. Great limestone quarries tend to make little of a miniature mountain near Tsinanfu, and passing these the capital of Shantung is reached before dark. A new station is here being built, and the railway is equipped with large yards and an abundance of space for sidings, all of which has been made the most of. Coolies from the Hotel Trendle wait on the station and the visitor can obtain excellent food and sleeping accommodation at this hostelry. The following morning he must be abroad early to catch the train for Tientsin, and here commences the

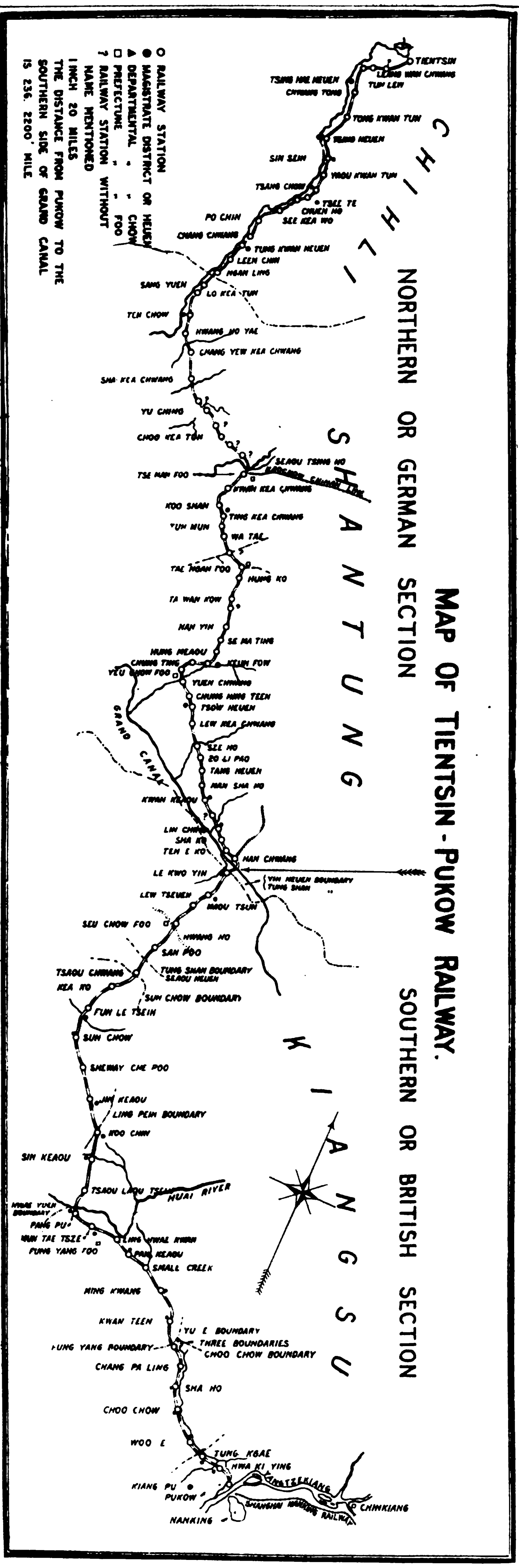
Fourth Stage.—The train for Tientsin leaves at 7.30, and the fares for the journey only vary in the matter of a few cents from those charged for the other stages. In the matter of a quarter of an hour the train arrives at the south bank of the Yellow River, and here passenger and baggage must disembark to cross the river. It must be noticed that the railway company decline to take any responsibility for passengers or their baggage in the crossing of the stream. Coolies shoulder the baggage and the passenger walks a few hundred yards to where a launch with barges is waiting. Upstream the great bridge is slowly but surely being thrown across the river and presents an imposing spectacle. The river runs strongly at this point and the launch needs all its steam to keep the laden barge beyond the power of the current. The bridge takes up all the attention of the passenger, however, and whilst he is studying it the launch completes the journey. The bridge when completed will be 4,050 feet in length and comprises nine spans of 91.5 metres each, two of 128 metres each and one, the central, of 164 metres. It is an imposing structure, and has, so far as the piers are concerned, been difficult to build. It was impossible for the engineers to find a solid bottom, and after going down some depth they were compelled to drive piles and upon those place the concrete foundations. They estimate that the silt at the bottom of the river to a depth of from two to three feet is constantly moving with the stream, so strong is the flow of water.

Whilst this bridge is more imposing than the one crossing the same river on the line from Hankow to Peking it is not so long, that bridge being some 9888 feet in length, consisting of 103 spans of 30 metres each. Workmen are busily hastening the junction of the central span of the new bridge and it is expected that the last rivet will be driven some time in October or early November. Meantime travellers will be compelled to use the ferry across the stream and suffer the inconvenience of changing.

The train from the northern bank starts for Tientsin about 9 o'clock, and passes through continuous cultivation. Kaoliang fields stretch away to the horizon in some places, and in all cases the land is under crop to the hills and even half way up them. The terminal station of this line is named Tientsin Central, but if the train is on time the passenger will do well to cross the line and wait for the train from Peking to go to the Tientsin station. From Tientsin Central to the British Concession is a long and tedious rickshaw journey. According to time table the train is due at Tientsin Central at 6.59 p.m. and that gives ample opportunity to transfer baggage and connect with the train for Tientsin, the first class fare for the extra length being fifty cents. All rates given in this article are, of course, Mexican, the local currency. If the traveller is bound for Peking he will catch the train leaving the next morning at 8.10, the first class fare being $5.20, and thus he enters upon the

Fifth Stage.—Continuing through country still under the plough, with fruit trees relieving the erstwhile monotony of cereal growth, the famed walls of Peking rise to view about 10.50 and skirting beneath the shadow of these grim enclosures of inspiring historic memorials he reaches the station near the Water Gate at 11. Another train leaves Tientsin at 3.45 p.m. and reaches Peking at 6.55. p.m.

Under the conditions herein described the journey by train from Shanghai to Tientsin is but little faster than by steamer, but when the Yellow River Bridge is completed it is the intention of the authorities to put on a service of through trains which will travel by night and thus reduce the journey to some 36 hours, making the route the shortest available from Shanghai to Peking. With the establishment of regular through trains this line is bound to develop enormously, and concurrent with that development will come the rise of the river port of Pukow. Capable of berthing deep sea steamers at its wharves it is, in the natural order of things, certain that eventually it will become a shipping port of note, and already plans have been devised for equipping it with the means to handle inward and outward cargoes of bulk. But that is another story.



CHOSEN (KOREAN) RAILWAYS

RAILWAY TRAFFIC.

The total length of the railway line open for traffic, passenger or freight, was 674.6 miles in the fiscal year 1910, showing an increase of 34.1 miles, as compared with the preceding fiscal year. This increase was principally due to the opening of the *Heijo-Chinnampo* line in the same fiscal year. On examining the results of operating, the train mileage is found to have been 2,102,122 miles and the total traffic receipts to have been 5,018,331 *yen*, showing an increase, respectively, of 180,885 miles and of 873,274 *yen*. Transportation traffic conducted during the fiscal year 1910, as compared with the preceding fiscal year, can be seen in the appended table:—

Description		1910— 1	1909—10	Increase (+) or Decrease (–)
Length of Lines open to Traffic. (average)..		*mile* 674.6	*mile* 640.5	+ *mile* 34.1
Total Train Mileage		2,102.122	1,921,237	+ 180,885
Total Number of Passengers		*men* 2,024,490	*men* 1,930,442	+ *men* 94,048
Total Amount of Goods		*kin* 9,057.591	*kin* 8,044,876	+ *kin* 1,012,715
Total Amount of Freight		*ton* 888,723	*ton* 712,137	+ *ton* 176,586
Total Receipts from Fares........		*yen* 2,613,452	*yen* 2,302,063	+ *yen* 311,389
Total Receipts from Freight...........		2,404,879	1,842,994	+ 561,885
Total		**5,018,331**	**4,145,057**	+ **873.274**
Average Receipts from Fares....	per day per mile.	*yen* 9.88	*yen* 9.05	+ *yen* 0.83
Average Receipts from Freight..	per day per mile.	9.23	7.33	+ 1.90
Total Average Receipts	per day per mile.	19.06	16.33	+ 2.73

As shown in the above table, a better result was obtained in every respect. Though several obstacles were caused by floods on the *Masampo* branch line in the summer season and by an epidemic on the *Keijo-Shingishu* line—cholera breaking out in *Heijo* and its vicinity and pest in Manchuria—, yet the general railway traffic in the Peninsula has largely increased, owing to the fact that public peace being more firmly established after Annexation, better opportunities of safe travel were afforded, as well as larger shipment of agricultural products, the latter being very marked in the year 1910 owing to a good harvest.

The general account of the railway traffic for the fiscal year 1910, compared with that of the preceding fiscal year, shows much better results as may be seen in the following table:—

The total receipts from the railways for the fiscal year 1910 reached 5,142,446 *yen*, being an increase of 898,242, or 21.2 per cent, as compared with the figures for the preceding fiscal year, while the total expense of operating the railways, including the expenses of the Railway Bureau, amounted to 4,804,066 *yen*, being an increase of 599,860 *yen* or 14.3 per cent. Thus the railways' net earnings amounted to 338,380 *yen* for the fiscal year 1910 against 39,998 *yen* for the preceding fiscal year (1909), whereas a deficit had been shown in each of two fiscal years of 1908 and 1907. In such circumstances the railways in the Peninsula are now gaining financial stability. As to the capital account of the railways, about 6,255,000 *yen* was the increase for 1910. Adding the amount to the capital transferred from preceding years, the total capital reached 95,836,072 *yen*, of which 94,502,700 *yen* was fixed, the balance belonging to the account for the purchase of materials.

Items	1910—11	1909—10	Increase (+) or Decrease (–)	
			Amount	Percentage
Receipts from Traffic	*yen* 5,018,331	*yen* 4,145,057	+ *yen* 873,274	+ 21.1
Receipts from miscellaneous sources.	124,115	99,147	+ 24,968	+ 25.2
Total Receipts...........	**5,142,446**	**4,244,204**	+ **898,242**	+ **21.2**
Expenses	4,804,066	4,204,206	+ 599,860	+ 14.3
Profits	338,380	39,998	+ 298,382	+ 746.0

In April 1910, an association affording protection or relief to those suffering from sickness, injury or losing their employment was first organized by the railway employees. Its membership reached 4,040 by the end of the fiscal year 1910, and its funds, including a government grant, fees collected from members and interest on deposits, aggregated 58,268 *yen*, 15,156 *yen* out of this fund was paid out to 719 members who fell under the above categories.

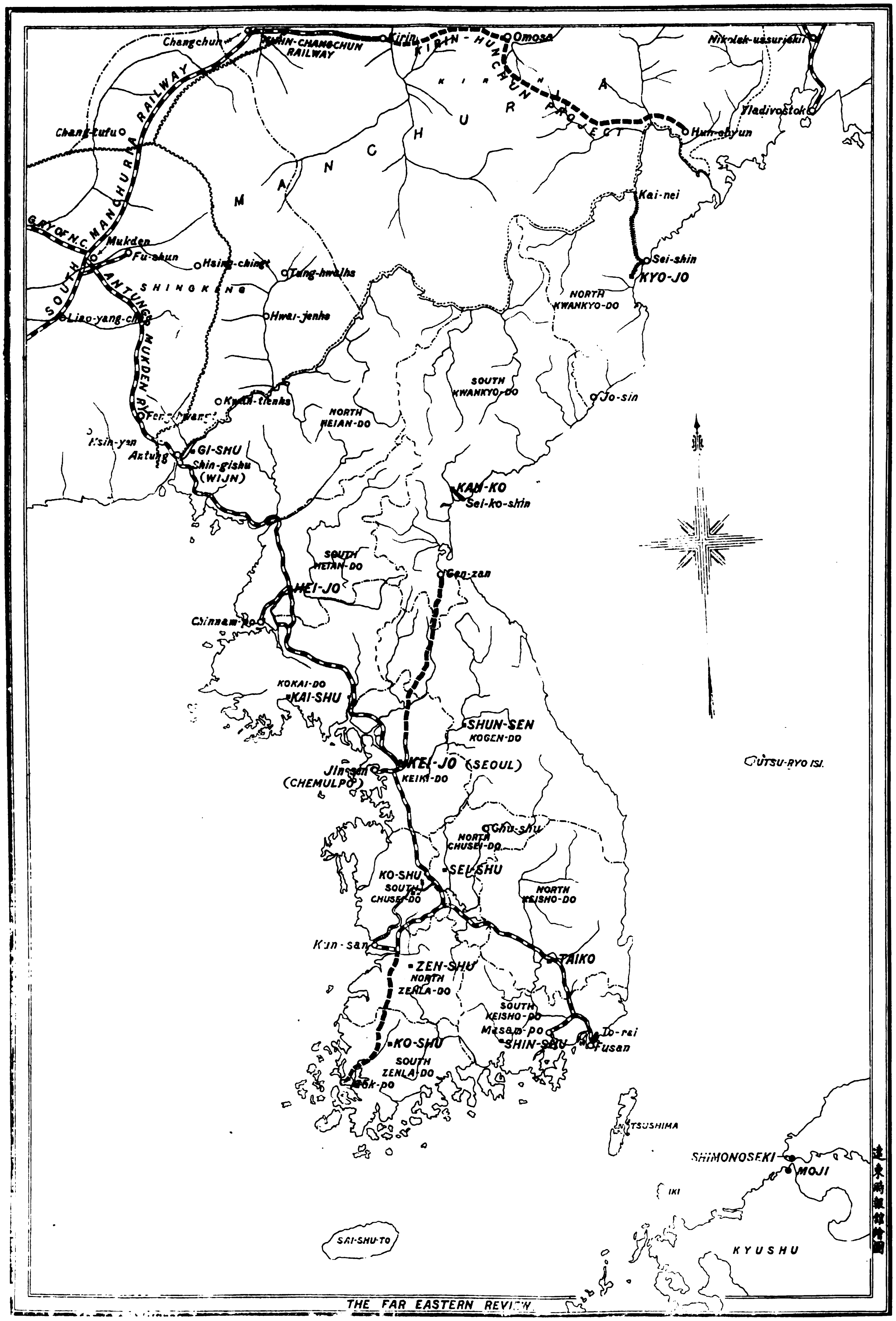
Regarding accidents on the railways during the fiscal year 1910, the train service on the *Masampo* line was interrupted for 15 days owing to floods which took place several times in the summer season. As to other accidents, numbering 827, the cars were derailed 52 times, there were 5 collisions, 3 over-turnings, 30 cases of damage done to rails by natural calamities or by indivduals, 151 to trains, 11 by fire, and so on. In addition, there were 81 deaths and 61 cases of injury from accidents among railway employees during the fiscal year 1910.

RAILWAY CONSTRUCTION

With regard to railway construction in the Peninsula, work on a railway between *Heijo* (*Pying-yang*) and *Chinnampo*, which was commenced in August 1909, being completed in 1910, the railway traffic on this line, a distance of 34 miles 46 chains, was commenced in October 1910. This railway was hastily constructed, improvements of sharp curves and temporary bridges being deferred for gradual consummation. The building of permanent iron bridges had been already commenced in 1910. The construction of two railways—the *Taiden-Mokpo* line with a branch to *Kunsan*, and the *Keijo-Gensan* line—planned to be carried out in 11 years beginning from the fiscal year 1910, was passed in the 26th session of the Imperial Diet. The former line, starting at the port of *Mokpo*, is to connect with the *Fusan-Keijo* line at *Taiden* station *via Lashu*, having a branch to the port of *Mokpo*. The total length of this railway is 174.5 miles, the total outlay required being estimated at 12,824,354 *yen* with an addition for rolling stock amounting to 2,175,646 *yen*. As to the other railway, the line starting from the port of *Gensan*, is to connect with the *Fusan-Keijo* line at *Ryusan*, a suburb of *Keijo*, *via Giseifu*, *Tetsugen* and *Heiko*. The total length of this trunk line is estimated at 136.3 miles, and the construction is also to be commenced in the beginning of the fiscal year 1910, the total expense required for the construction of the *Gensan-Keijo* railway being estimated at 14,330,698 *yen*, besides 2,044,500 *yen* for rolling stock. But the conditions existing in the Peninsula requiring hasty completion of the transport facilities, the above mentioned plan was modified so as to be carried out in 5 consecutive years, beginning from the fiscal year 1910, instead of 11 years, and the modified plan was passed in the 27th session of the Imperial Diet in 1911.

As to improvements of railway tracks, the work on the *Keijo-Fusan* line was completed by the end of the fiscal year 1910. In the *Keijo-Shingishu* line, improvement work extending to 44.1 miles, was completed during the fiscal year 1910, 270.3 miles being finished by the end of the same fiscal year in the total length, and the remaining 38.9 miles is expected at the same time as the railway bridge on the *Oryoku* river, namely, before the Imperial Birth-day of the following year (November 3, 1911).

The building of a steel bridge over the *Oryoku* river was commenced on August 1, 1909. The total length of this bridge will be 3,108 feet, consisting of 12 spans of 200 or 300 feet each. A span of 300 feet in the middle part of the bridge is to be capable of being opened to permit the passage of ships. 2,000,000 *yen* was estimated as the cost of building this bridge, and its completion is expected by the



Lines Open
„ Under Construction
Light Railways

OFFICIAL MAP OF KOREAN RAILWAYS, 1912

time when the *Keijo-Shingishu* line is connected with the *Antung-Mukden* line in Manchuria, during the fiscal year 1911.

STREET-CAR AND LIGHT-WEIGHT RAILWAYS.

Matters concerning street car and light-weight railways were originally supervised by the Home Department of the late Korean Government and the former Japanese Residencies, but in the sequel of Annexation their supervision was transferred to the Railway Bureau attached to the Government-General. Hitherto no regulations concerning street-cars and light-weight railways being provided, the general principles contained in the regulations enforced in Japan proper are observed, under the control and supervision of the Government-General.

A concession for constructing a street railway in *Keijo* (*Seoul*) was first given to the Electric Joint Stock Company by the late Korean Government in January 1898, which concession being transferred to the Korean-American Electric Street Car Company in 1904, the line was built by the latter. This street railway, however, was sold, in August 1909, to the Japanese-Korean Gas Company for 1,700,000 *yen*, and since its transfer to this Japanese Company, many improvements were made by laying better rails, building extensions and making double tracks—all of which amounted practically to reconstruction. The total length of this street railway reached 16.3 miles at the end of 1910. In *Heijo* (*Pying-yang*), a street-car line operated by hand was built from the railway station to the native town *via* the Japanese town in 1906. As to light-weight railways in Korea, a line running between *Fusan-chin*, a suburb of the port of *Fusan*, and *Torai*, a hot-spring resort, was built with a total length of 6.23 miles by the *Fusan* Light-Weight Railway Corporation, and being bought, on February 2, by the Korean Gas and Electric Company, which was organized by the Japanese, is now maintained by the Company. In addition there are still two more light railways operated by hand power: one running between the ports of *Seishin* and *Kainei via Ranan* in North *Kwankyo* province, and the other between *Kanko* and *Seikoshin* in South *Kwankyo* province. Both of them were built by the Japanese Army during the war with Russia for army transport. After the war, these light railways became carriers of goods for the general public. The following table shows the general features of the electric car and light-weight railways existing at the end of December 1910:—

Description	Length of Rail	Size of Gage	Motive Power	No. of Passengers	Amount of Freight	Receipts from Traffic	Operating Expense	Net Profit
	mile	*feet*			*car*	*yen*	*yen*	*yen*
Electric Street Car in *Keijo*	12.88	3.06	Electric power	3,212,387	3,797	167,954	110,946	57,008
					kin			
Light Railway between *Fusan* and *Torai*	6.23	2.00	Steam power	25,164	240	2,697	2,345	352
Light Street Car in *Heijo*	1.36	2.00	Human power	92,377	—	8,913	7,506	1,407
					ton			
Light Railway between *Seishin* and *Kainei via Ranan*	80.00	2.00	Human power	54,596	5,242	63,974	60,567	3,407
Light Railway between *Kanko* and *Seikoshin*........	8.25	2.00	Human power	10,909	8,566	24,775	23,523	1,252

THE PEKING-KALGAN RAILWAY AND ITS EXTENSION

In pursuance of his desire for intimate acquaintance with China's railways, and some direct knowledge with regard to their construction and maintenance, Dr. Sun Yat-sen traversed the line between Peking and Kalgan early in September. Leaving Peking on the morning of the sixth he reached Kalgan on the seventh, and had opportunity to obtain first hand knowledge of the first of China's railways to be built by Chinese engineers and be controlled by Chinese traffic managers and general staff. The Chinese are proud of this effort. Not only does the route present acute difficulties from an engineering point of view, but it also tests the efficiency of those deputed to run it. Dr. Sun was shown that the line was not only being well maintained, but that it has been brought to a profit-earning stage.

We are able to give herewith an interesting statement of figures which shows the results of working from the period of opening to date, and study of them will exhibit the reasons for the assumption in Chinese circles that properly trained Chinese are able effectively to cope with many of the difficulties which are overcome by Europeans in the management of new lines.

The line now open to traffic is 201.73 miles in length, the present terminal being at Yangkowhsien. To Kalgan the distance is 123.89 miles, and the earning capacity of the line is on the increase, according to the figures given. Between October 14, 1909, when the line was opened to regular traffic, and February 9, 1910, the loss was $326,156, with a ratio of working expenses to earnings of 168.45%. By January 29, 1911, a profit of $75,395 had been made, with a reduction in the ratio of working expenses to earnings to 94.32%. By February 12, 1912, the profit had been increased to $649,602, with the ratio of working expenses to earnings at 60.12 %, and the present year gives indications of a record, the result for the period between February 13, 1912, and June 30, 1912, being a profit of $540,623, with the ratio of working expenses to earnings standing at 42.50 %. This is an excellent showing. The capital charge on the line, including value of all assets, is set down at Taels 6,935,086, whilst that of the Mentoukou branch line is Taels 561,787. This branch line

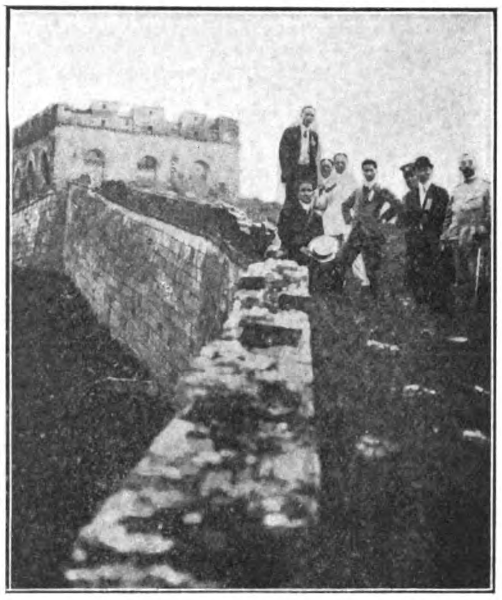
DR. JEME TIEN-YU, PH.D.

BUILDER OF THE KALGAN RAILWAY

runs out from Peking a distance of some sixteen miles to a group of coal mines and transports some 500 tons per day to the capital. The freight carried from the interior on the main line is composed mainly of grain, millet, kaoliang, linseed, and wheat, whilst wool, hides, and furs also come down in increasing quantities. Pigs are also transported, and it is hoped ere long to develop traffic in horses, cattle and sheep from the great grazing grounds of Mongolia.

The cost of working the system is greatly increased by the necessity which exists to break the trains to descend or ascend the Nankou Pass. There the grade at its steepest is one in thirty, whilst the curves have no greater radius than 600 feet. To negotiate this part of the line special locomotives are employed, Mallet engines being used on the passenger trains, and American-geared Shay locomotives for freight. The Mallet engines weigh 105 tons when loaded, and the Shay engines 100 tons. The down trains are divided at Nankou, and the sections shoved up the inclines to Kongchuang, where the train is reformed for its journey to the terminus. The up trains are similarly divided at Kongchuang and reformed at Nankou for the continuation of the journey to Peking, Mogul engines being used on the line either side of the pass. The working of the pass is extremely dangerous owing to the sharp grades and narrow curve radius, but ample provision in the shape of catch sidings is made to arrest runaways, whilst an extra force of maintenance men and track walkers is employed to keep a constant eye upon the permanent way and the cuttings and embankments. The greatest vigilance is shown in this particular section, and no opportunity is given for landslides or weakening of retaining walls. In this respect the Engineer-in-chief shows a realisation of the importance of unceasing effort in maintaining a high standard of efficiency that is unusual in Chinese. Mr. Kwang King-yang, the Engineer-in-chief, who was originally the divisional engineer in charge of the construction from Peking to Nankou, deserves high praise for the efficiency which he has secured throughout the whole length of the line.

As has been pointed out in previous issues of the FAR EASTERN REVIEW the line is built



DR. SUN YAT-SEN AND PARTY ON THE GREAT WALL OF CHINA

to standard guage, that is 4ft. 8½ inches. The rails are 85 lbs. steel rails of Belgian make, the sleepers, except on the Pass, being Japanese, 13 being used to a 30ft. length of rail. American Oregon pine ties creosoted, are used on the Pass, and special provision is made to prevent the line slipping. The ballasting is of crushed stone from the quarries of the railway, eight inches being beneath the ties.

The most difficult portion of the line to construct was, of course, at the Nankou Pass. There the cutting was exceptionally heavy and the ascent of the gorges extremely difficult. Four tunnels had to be bored, the one on the summit being 3000 feet in length. It took four years to build this section. The longest bridge on the line is 800 feet, all bridges being steel girders on concrete piers, the largest span being a 110 foot girder. The station buildings are neat and serviceable. They are of brick, with corrugated iron roof, and are all built to one design. The platforms are faced with stone or concrete.

There is a short spur at Chi Ming Shan built to bring coal in from the Railway's mines some three miles distance. The output is about 150 tons per day. This line has been operating about four years.

MR. K. Y. KWONG
PRESENT ENGINEER-IN-CHIEF OF THE KALGAN RAILWAY AND EXTENSION

OFFICIAL REPORT PEKING-KALGAN RAILWAY

(Mentonkou Branch Line included)

Results of op ration (From the opening of the Line up to date)

Date	Particulars	Earnings detailed		Earnings & Working Expenditure		Working Results (Profit or Loss)		Ratio of Working Expenses to Earnings
		Dollars	cts.	Dollars	cts.	Dollars	cts.	
14th Oct. 1909 to 9th Feb. 1910	Passenger	120,852	750					
	Freight	345,656	140					
	Miscellaneous	9,932	695					
	Total Earnings			476,441	585			
	Total Working Expenditure			802,598	330			
	Loss (Net)					326,156	745	168.45% *
10th Feb. 1910 to 29th Jan. 1911	Passenger	427,007	530					
	Freight	875,546	370					
	Miscellaneous	27,078	500					
	Total Earnings			1,329,632	440			
	Total Working Expenditure			1,254,236	875			
	Profit, (Net)					**75,395**	**525**	**94.32%** †
30th Jan. 1911 to 12th Feb. 1912	Passenger	417,980	500					
	Freight	1,001,835	710					
	Military Traffic	142,809	700					
	Miscellaneous	36,424	454					
	Total Earnings			1,629,050	364			
	Total Working Expenditure			979,447	444			
	Profit (Net)					**649,602**	**920**	**60.12%** †
13th Feb. to 30th June 1912	Passenger	183,768	150					
	Freight	819,568	800					
	Miscellaneous	30,892	144					
	Total Earnings			1,034,229	184			
	Total Working Expenditure			439,606	122			
	Profit (Net)					**594,623**	**062**	**42.50%** †

* Loss. † Profit.

Comparative Statement of Passenger and Freight Earnings

(From the opening of the Line up to date)

Date	Passenger Earnings		Average Monthly Passenger Earnings		Freight Earnings		Average Monthly Freight Earnings	
	Dollars	cts.	Dollars	cts.	Dollars	cts.	Dollars	cts.
14th Oct. 1909 to 9th Feb. 1910	120,852	750	30,213	187	345,656	140	86,414	035
10th Feb. 1910 to 29th Jan. 1911	427,007	530	35,583	960	875,546	370	72,962	197
30th Jan. 1911 to 12th Feb. 1912	447,980	500	34,907	570	1,001,835	710	78,065	120
13th Feb. to 30th June 1912	183,768	150	40,241	200	819,568	890	179,467	640

All amounts—Local Currency.

MR. C. T. SHAR
TRAFFIC MANAGER, PEKING-KALGAN RAILWAY

Though it was intended to go through with construction work until Tatung was reached, and thence on to Urga, the outbreak of the Revolution compelled a complete cessation of work, and resumption cannot take place until Government finances are placed in order and provision made for funds. The route has been laid out as far as Tatung-fu, an important city, destined to be the junction of the line branching away to Puchow, in Shansi, and it has been surveyed as far as Urga.

MR. KUAN MIEN-CHUN
MANAGING DIRECTOR, PEKING-KALGAN RAILWAY

Work will be continued to Tatung-fu as soon as money is available. The line will skirt the rocky hills that abound and it is expected that it will be carried out with a grade no greater than one of one per cent. There will probably be one tunnel of some 500 feet to bore, but otherwise no difficulties, except for a bridge of some 2,000 feet length (20 spans of 100 ft. steel girders on concrete pillars) at Tatung, where a river will have to be crossed at an awkward place to bring the line into the city. In their vicinity there are large coal fields, which are now being worked by the natives, mostly in a primitive way. There is some modern machinery on the ground, which was carried with tremendous difficulty over the long distance on carts, but when the line is down it is expected that a great fillip will be given to development of these coal fields.

The first stage of the projected line will end at Sui-yuan, and the matter of the Urga extension will be further considered. It is quite possible that in the near future the present branch line to Mantoukou from Peking will be continued to join the present line at Shaching station, in order to secure an easier grade. When the main line was originally built the engineer was given no choice of route, the officials desiring the nearest and cheapest route to Nankou. With the development of the line, however, the deviation will be made.

The Managing Director of the line is Mr. Kuan Mien-chun, who takes a keen interest in his work and his staff, and with his traffic manager, Mr. C. T. Shar, deserves commendation upon the successful results attained in the working of the line.

It may be incidentally mentioned that the Great Wall of China is passed through in the Nankou Pass, and the tourist is given an excellent opportunity of viewing the tremendous difficulties overcome by the ancient builders in carrying the wall up the precipitous steeps and along the crest of the mountains. To enable Dr. Sun Yat-sen to go to the wall the train was delayed some time. Despite the lateness of the hour—it was after six in the evening—the party clambered to the wall and there in the drizzling rain and mist a photograph was taken. The result is unique inasmuch as it is the first and only picture of the attainment by Dr. Sun Yat-sen of a seat on this ancient pile in the far north of the Republic.

PEKING KALGAN RAILWAY

Official Report of Capital Work

(From Lin-Chune, Feng-tai to Kalgan (sidings included)......449 Chi. lis)

Particulars	Amount	
	Taels	cts.
Land	321,668	8870
Material and Rolling Stock	3,888,817	0626
Construction Work	2,084,792	9560
Administration and Engineering Charges	288,861	3080
Telegraph Line	89,364	4270
Police	23,485	5230
Material Transportation	179,844	6740
Train Working	52,355	0310
Public Works (Hsichihmun)	5,896	3370
Total....................	6,935,086	2050

Mentoukou Branch Line

Official Report of Capital Work

(From Hsichihmun to Mentoukou ......47.4 Chi. lis)

Particulars	Amount	
	Taels	cts.
Land	45,879	9810
Material and Rolling Stock	380,740	6215
Construction Work	68,344	3680
Administration and Engineering Charges	40,091	6080
Telegraph Line	952	3080
Police	1,020	0730
Material Transportation	24,758	4660
Total........................	561,787	4255

All amounts—Local Currency.

HANYANG IRON AND STEEL WORKS

(Official Report)

The Han-yeh-ping Iron & Coal Co. (Ltd.) has furnished Consul Roger S. Greene, the following figures as to operations in the year 1911 (Chinese calendar, Jan. 30, 1911, to Feb. 17, 1912):

Pig iron.	Tons.
Total output	93,337
Shipments to:	
Hankow and other Chinese ports..........	9,824
Japan	58,525
United States	1,165
Australia	5,765
Saigon	40
Total	78,629

Rails.	Tons.
Total output..................	24,216
Sales of rails and fastenings in China	23,492
Merchant bars, sales in China	1,250

During the year 359,467 tons of iron ore were produced at the company's Tayeh iron mines. According to the Chinese customs returns, the export of iron ore and pig iron in tons, for the year 1911 (new style), were as follows:

	To foreign ports.	To Chinese ports.	Total.
Iron ore	110,500	20	110,520
Pig iron	51,300	26,128	77,428

The iron and steel works at Hanyang have been shut down since the outbreak of the revolution last October, but preparations for resuming work are well advanced, the furnaces not having been so seriously injured as expected by being abandoned while charged. The foreign experts formerly employed have all been discharged. The iron mines at Tayeh continued working throughout the fighting.

ELECTRIC INSTALLATION AT HOLT'S WHARF, LOWER POOTUNG, SHANGHAI

For the lighting of the new wharf which Messrs. Alfred Holt & Co., of Liverpool, (the Ocean Steamship Co.) have recently built at Lower Pootung electric generating plant has been installed in a power house at the back of the wharf premises.

This plant also supplies power to lifts in the storage godowns and to pumps used for the fire service, these being all electrically operated.

The generating plant consists of two direct coupled gas engine sets, each capable of a normal continuous current output of 116 kilowatts at 220 volts and running at a speed of 240 r.p.m. (Figs. 1 and 2.)

The gas engines, which are of Messrs. Campbell & Co.'s manufacture, are of their most modern four cylinder vertical type, fitted with low tension magneto ignition and provided with specially heavy flywheels to ensure steady running and reduce cyclic variation within the limits required for electric lighting. The governors are of the makers' improved throttle type working on the "variable quality" system, in which only the strength or quality of the mixture is varied, its quantity and consequently the degree of compression in the cylinder remaining practically constant, thus ensuring ignition even of weak mixtures.

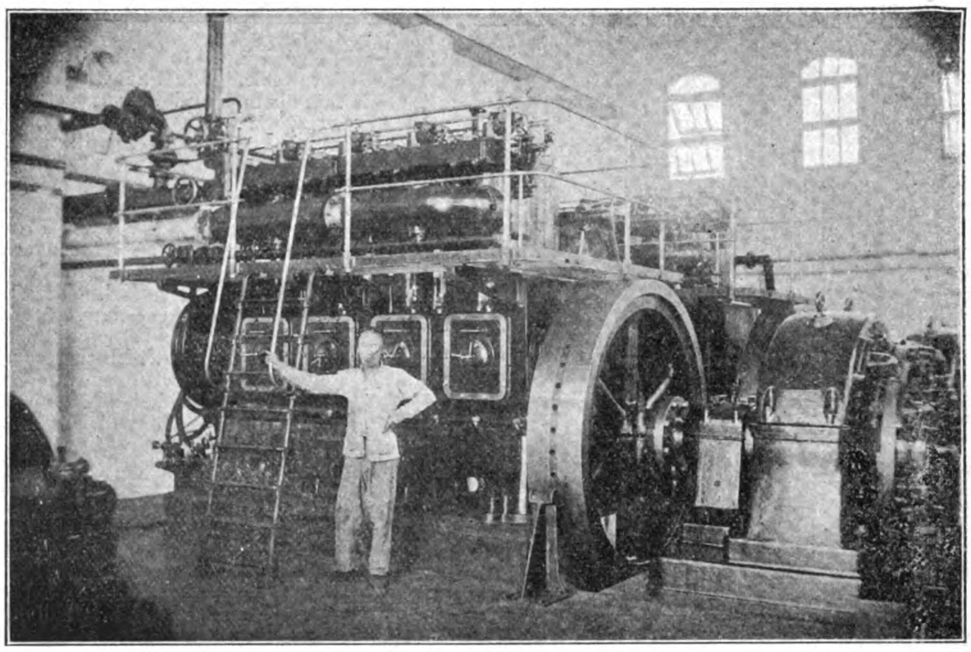


FIG 1:—DIRECT CONNECTED GENERATING SET: CAMPBELL GAS ENGINE AND SIEMENS BROS DYNAMO—116 K.W., 220 V., 240 R.P.M.

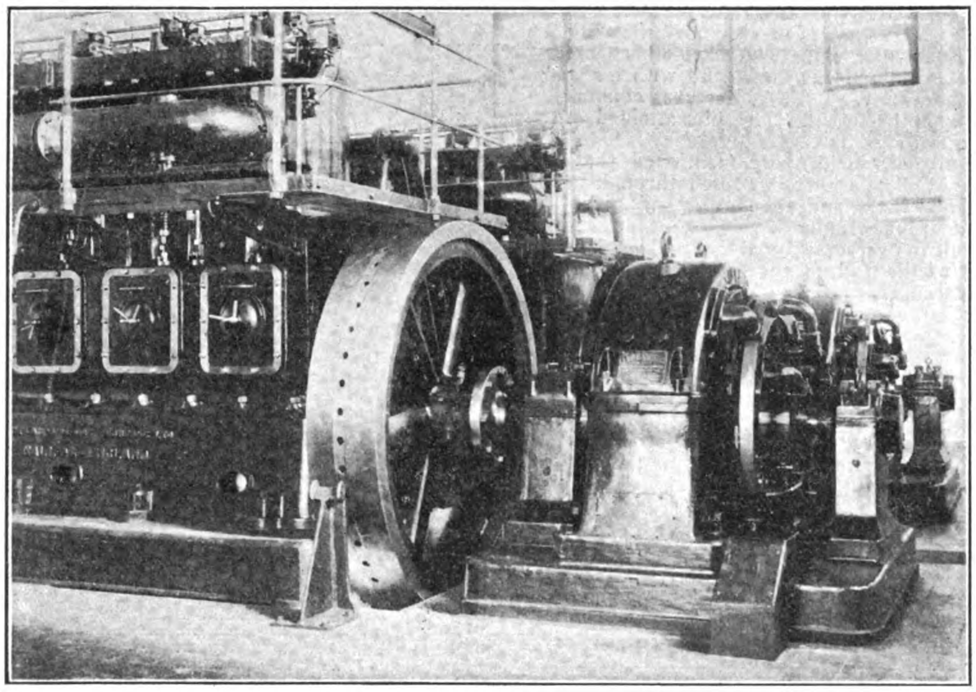


FIG. 2:—SAME AS FIG. 1

The dynamos are of Messrs. Siemens Bros Dynamo works' manufacture, having cast iron magnet frames divided horizontally, with laminated iron pole pieces, and over-compound wound field coils. The armatures are of the slotted drum type with former-wound multiple coils. All the windings have been treated with special damp-proof impregnation to adapt the machines for use in a damp climate.

A third Campbell-Siemens set of smaller capacity (Fig. 3) has also been installed to deal with the reduced night load in the event of arc lamp lighting on wharf and in sheds not being required for the discharging of cargo, and in this case the entire load of incandescent and police lighting is taken by this small set. The engine is of the single cylinder horizontal type and is direct coupled to a compound wound dynamo capable of giving a normal output of 15.5 kilowatts at 220 volts, running at 210 r.p.m.

The gas for the above engines is supplied by suction gas producer plant (Fig. 4), each engine having its own producer, the two large sets being cross-connected so that either engine can be run off either producer.

The producer plant is of Messrs. Campbell's latest pattern, the generators being of the open hearth type, which possesses several advantages over other types; for instance, inferior fuel, the use of which is impossible in generators fitted with the ordinary firegrate, can be used with satisfactory results; also, the plant can be kept at work continuously for long periods, as the fire can be cleaned and clinker removed while in full operation and without interfering with the production of gas. A further advantage is that the plant can be started up in less time than one of the ordinary type.

Cleaning and cooling of the gases is effected in coke and sawdust scrubbers.

The main switchboard, (Fig. 5) supplied by Messrs. Siemens Bros. Dynamo Works, is situated in the engine room, and consists of generator and feeder panels equipped with circuit breakers with automatic releases and all the necessary instruments and switches.

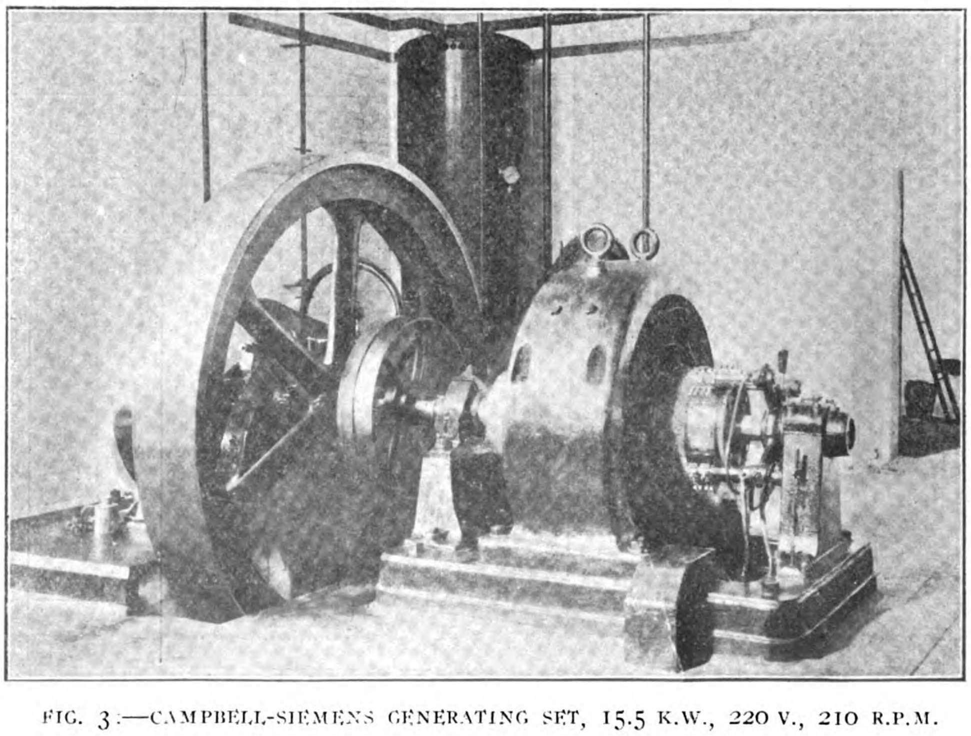


FIG. 3:—CAMPBELL-SIEMENS GENERATING SET, 15.5 K.W., 220 V., 210 R.P.M.

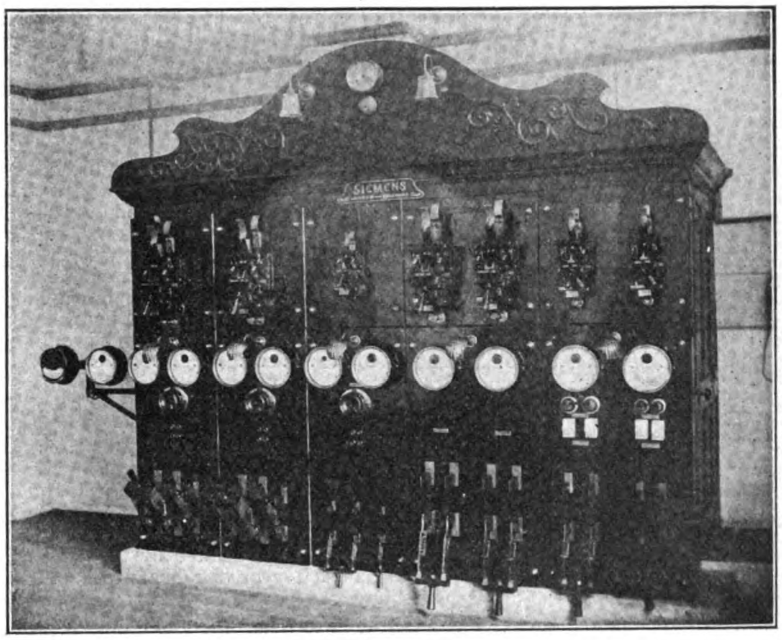


FIG. 5:—MAIN SWITCHBOARD

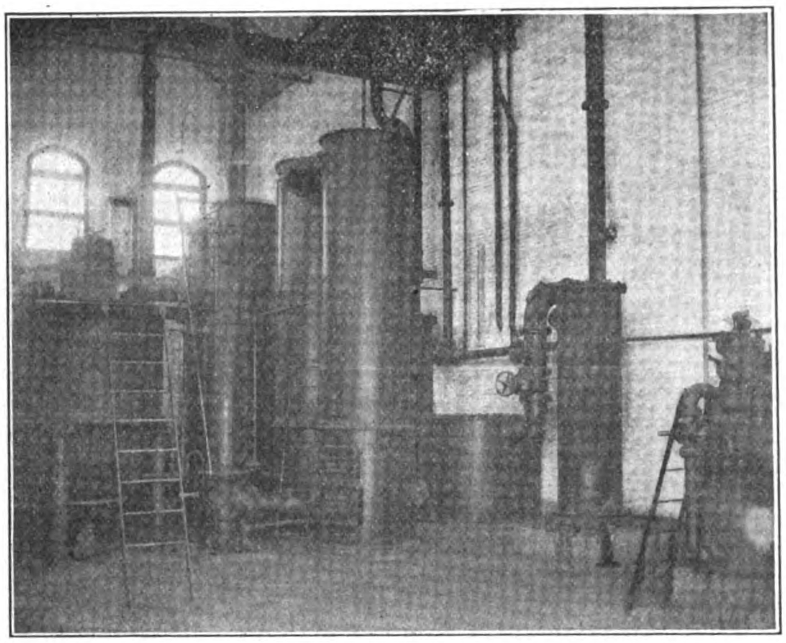


FIG. 4:—CAMPBELL GAS PRODUCERS

Paralleling instruments and switchgear are also provided so as to enable the sets to be run in parallel if required.

The main cables are run overhead (Fig. 6) from the power house to the office building, where the main distribution board is situated, and to the pump house. Those aerial cables, which are single braided, vary in size from one half to nearly one square inch section of stranded copper, and are supported from galvanised steel suspension wire by rawhide clips.

In the pump house, situated on the bank of the creek are installed two Campbell-Siemens electrically driven pumps. The pumps are of the three-throw ram type, 9 inch by 12 inch, each capable of delivering 480 gallons of water per minute against a head of 240 feet. The pumps are for use in case of fire occurring on any part of the premises, and an extensive system of underground piping and hydrants has been installed for this purpose. The pumps are driven through double reduction spur gearing by compound wound motors of 50 B.H.P. capacity each. These motors are fitted with commutation poles.

The four lifts in the storage godowns, which are four storied, are electrically operated. Each has a lifting capacity of 1½ tons of cargo at a speed of 60 feet per minute.

The whole of the wiring has been carried out on the distribution box system. All cable on the distributing side of the main distribution board consists of rubber insulated, lead-cased, "Association" cable of 2,500 megohm grade, varying from 19/14s. to 1/18s. S.W.G., and is run on porcelain insulators or cleats, being exposed throughout.

The fuses on the main distribution board and in all sub-distribution boxes are of Siemens "*Zed*" cartridge type. These fuses, besides operating in a perfectly quiet manner and giving a clear visible indication when "blown," have the advantage that a blown fuse can be easily and quickly changed, and their construction obviates the possibility of inserting a fuse of too large a capacity.

The wharf and premises are lighted by twenty 2,000 candle power arc lamps and six 1,000 candle power arc lamps, suspended from 50 foot steel poles (Fig. 7).

The transit sheds are lighted internally by means of thirty-four 1,000 candle power arc lamps. All the arc lamps are of Siemens' differential open type, capable of burning for about 24 hours without retrimming.

The godowns, office and quarters, power house, Chinese quarters, etc., are lighted by 16 and 32 c.p., incandescent lamps, carbon filament and "Tantalum," altogether about 900 in number.

The electric installation both as regards lighting and power equipment is in accordance with the most modern practice, and in thorough keeping with the wharf and buildings which are undoubtedly one of the finest examples of re-enforced concrete construction in the Far East.

Japanese Rubber Co. in Malaysia:—Messrs. Asada and Tajiri are about to form a company aided by the former managers of the Tokyo Railway Company,—Messrs. Mudaguchi, Inouye, Ando, Isobe, and Koizumi, with a capital of 500,000 yen. The object of the company is to cultivate the rubber tree in the Malay Peninsula.

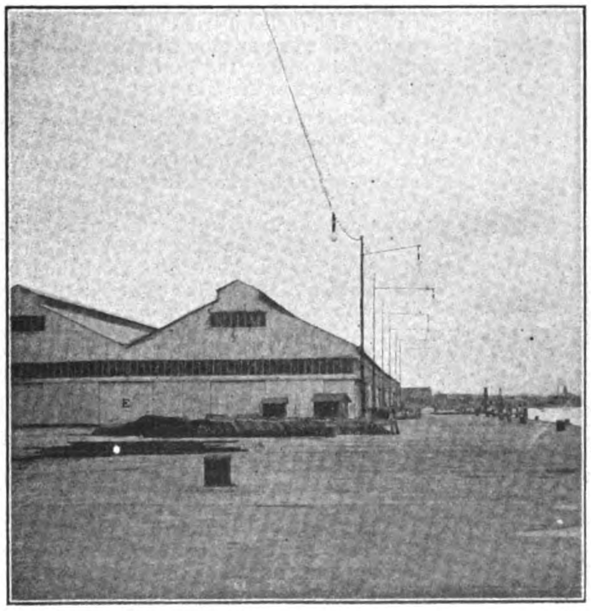


FIG. 7:—LIGHTING OF WHARF

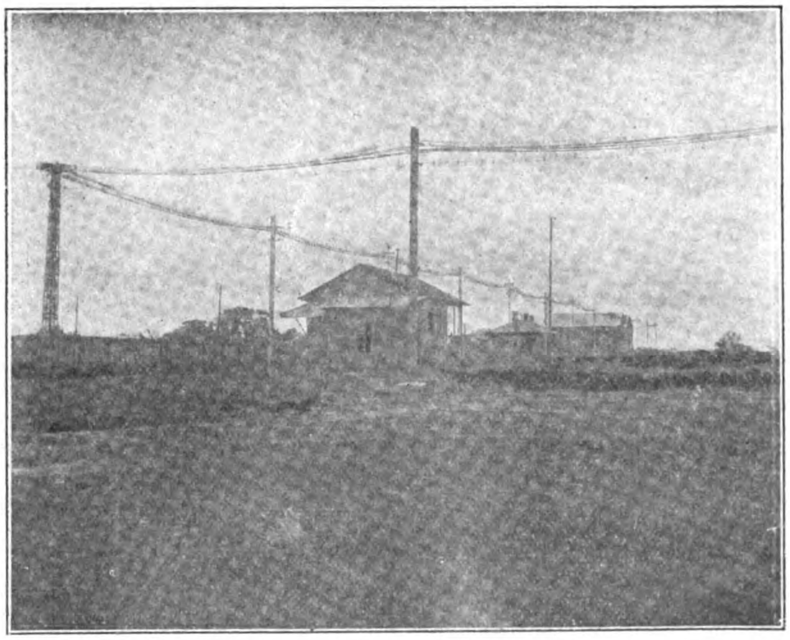


FIG. 6:—MAIN CABLES

IMPROVEMENT OF KELUNG HARBOR

MR. T. TAKAHASHI
DIRECTOR OF THE PUBLIC WORKS DEPARTMENT, GOVERNMENT OF FORMOSA

It was not until 1898 that plans for the improvement of the Formosan port of Kelung were completed and an estimate of the cost submitted to the thirteenth session of the Japanese Imperial Diet. As the improvement of the harbor would not be fully accomplished unless it included both the dredging of the inner harbor and the construction of a breakwater at the entrance, the cost of the work was included in one budget and estimated at 10,000,000 *yen* (about $5,000,000).

Although the importance of the work was not denied in the Cabinet meeting, it was decided that on account of the financial condition of the Empire at that time the work should be divided into periods, the first of which should meet only the urgent needs and consist of dredging parts of the inner harbor, to afford a safe anchorage, facilitate the working of cargoes, and secure better conveniences and a larger degree of safety to passengers than had hitherto been experienced from anchorage in the outer harbor. The work of the second period was to include the construction of the breakwater and other necessary quay walls and dredgings. With an appropriation of 2,000,000 *yen* ($1,000,000), the work that was to cover the four years from 1899 to 1902 was undertaken.

The Work of the First Period.—The object of the work of the first period was to dredge approximately 1,800,000 cubic yards from the inner harbor and to construct a temporary wooden pier of sufficient dimensions

DR. K. KAWAKAMI
CHIEF-ENGINEER, KELUNG HARBOR WORKS

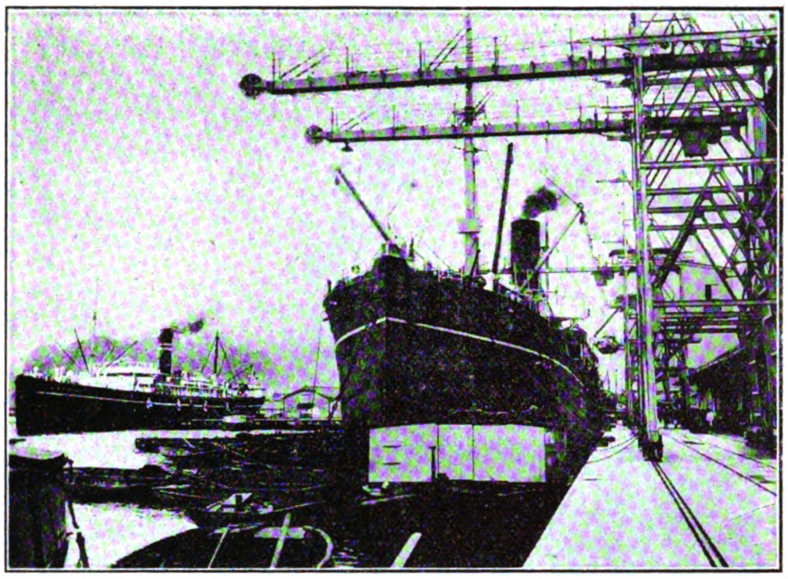
to permit steamers of 3,500 tons to lie alongside. Numerous accidents (including the loss at sea of two dredgers) and unforeseen delays occurred, and it was not until 1902, or the last year of the first period, that dredging was done satisfactorily. By June, 1902, the dredging of a portion of the inner harbor was finished. The temporary wooden pier was then constructed and thereafter large steamers were enabled to lie alongside. This pier obviated the inconvenience to passengers of boarding by means of sampans and the loading and discharging of cargoes through lighters. A careful investigation of the nature of the work and the conditions under which this pier was constructed should conclusively prove that its construction was not uneconomical. This pier cost 80,000 *yen* ($40,000), the expense being about equally divided between material and labor. Much of the material, being iron, can be removed and utilized elsewhere if necessary. Furthermore, the sum expended by the Osaka Shosen Kaisha each year for boats to handle passengers and cargo will now be saved, and from this saving alone the expenditure of 80,000 *yen* will be realized in two years and two months.

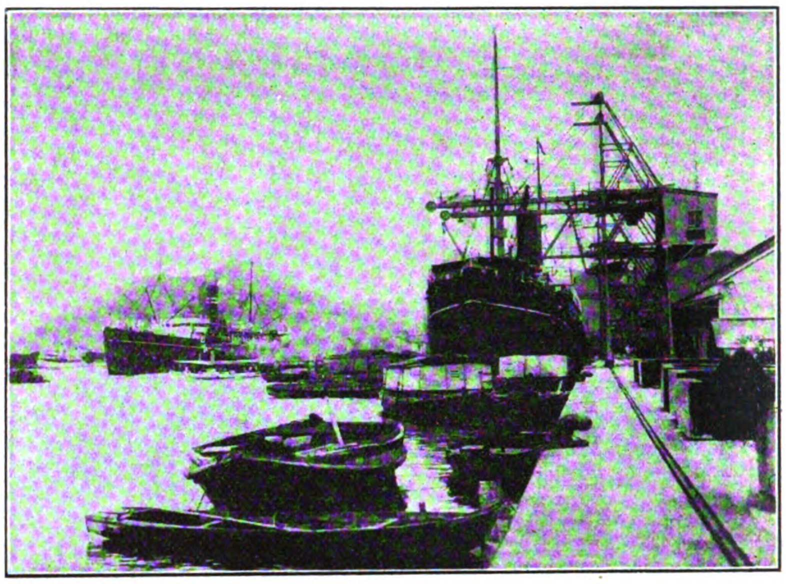
The length of the pier is 448½ feet and its width 24 feet. It affords accommodation for a steamer of 3,000 tons to lie on each side and discharge cargo at the same time with safety. In addition to this work, an area of about 15 acres was dredged to a depth of 6 feet at low water for an anchorage for steam launches and junks and to give shelter in times of storm to a number of towing boats belonging to the Harbor Improvement Bureau. Three fairways were also dredged to a width of 90 feet and a depth of 5 feet at low water. These fairways extended in the direction of Giju-bashi and the market place. Of the soil from these fairways and the anchorage for launches and junks about 157,200 cubic yards were utilized for reclamation. The main channel leading to the pier, while but 400 feet at its narrowest, is much wider at both entrances, so that there is no inconvenience to steamers passing in and out, and while two steamers lie alongside the pier there is also room for another at anchor.

As the Harbor Improvement Bureau had acquired many vessels, machines, tools, etc., it became necessary to have an ironworks and machine shop to keep the property in repair; also two slipways for repairing the vessels. One of these slipways is 750 feet in length and is capable of taking vessels up to 1,000 tons; the other has a length of 358 feet and accommodates vessels up to 100 tons. The most expensive items in the list of properties are 2 dredgers (which cost $391,725), 11 hopper barges, and 9 steam launches for towing. This equipment was not only necessary in this work, but will also be found useful in other extensive undertakings in the future.

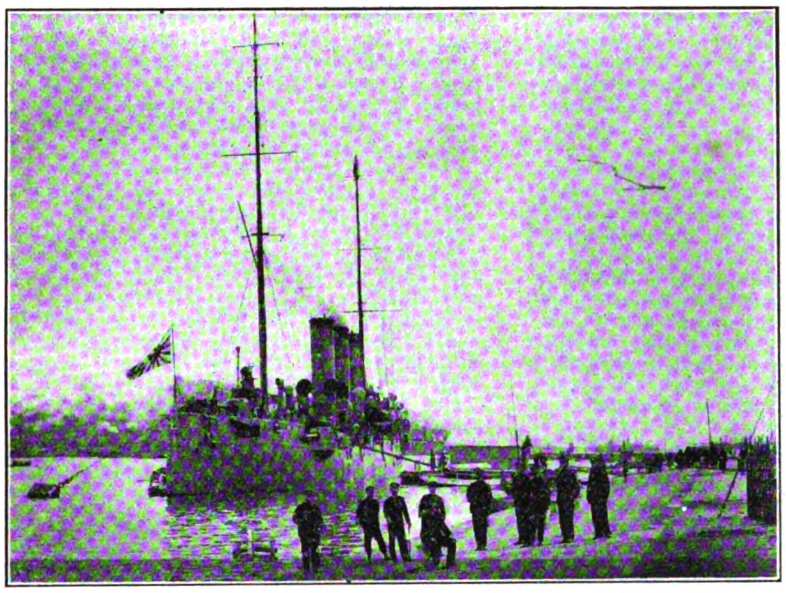
Outline of the Second Period.—In the twenty-third session of the Imperial Diet, in 1906, the expenditure for the work of the second period, amounting to 6,200,000 *yen* ($3,100,000) and to spread over seven fiscal years, from April, 1906, to March, 1913, was approved. This amount was still not sufficient to cover the whole of the work in the outer and inner harbors. Accordingly, the original plan was altered, and it was decided to complete first the warehouses and quay accommodations that were greatly needed on account of the enormous increase of traffic, while the construction of breakwaters at the entrance of outer harbor was set aside as an undertaking for the future.

The following is an outline of the work of the second period: The work will cover a period of seven years, from April, 1906, to March, 1913. A quay wall 2,550 feet in length is to be constructed between the new and old railway stations, and sheds and warehouses will be erected, where also electric capstans and cranes will be provided. Quay walls to accommodate junks and steam launches are to be constructed along the shore of Dai-Kelung

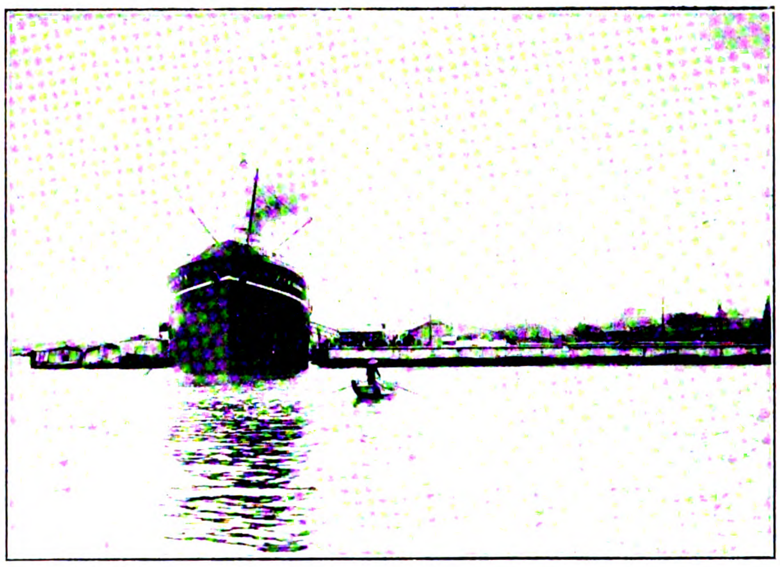




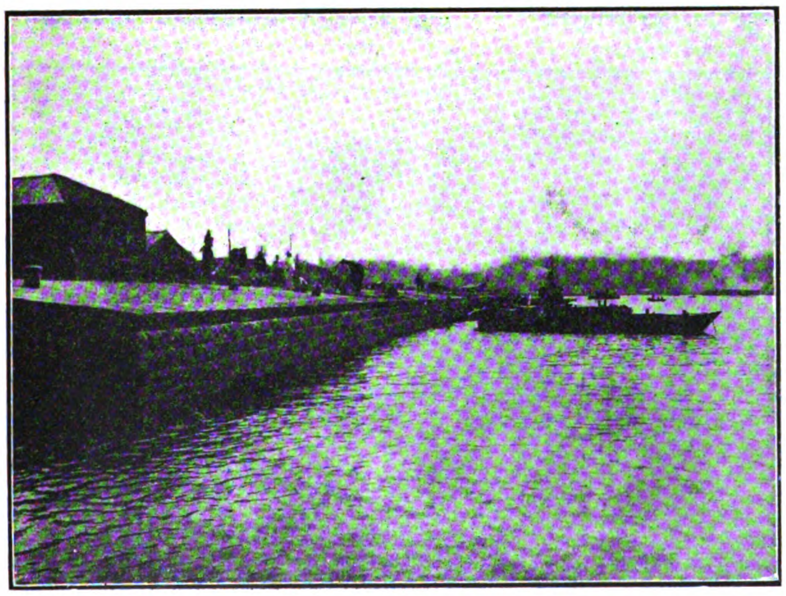
ELECTRIC LOADING, UNLOADING AND TRANSPORTING MACHINES



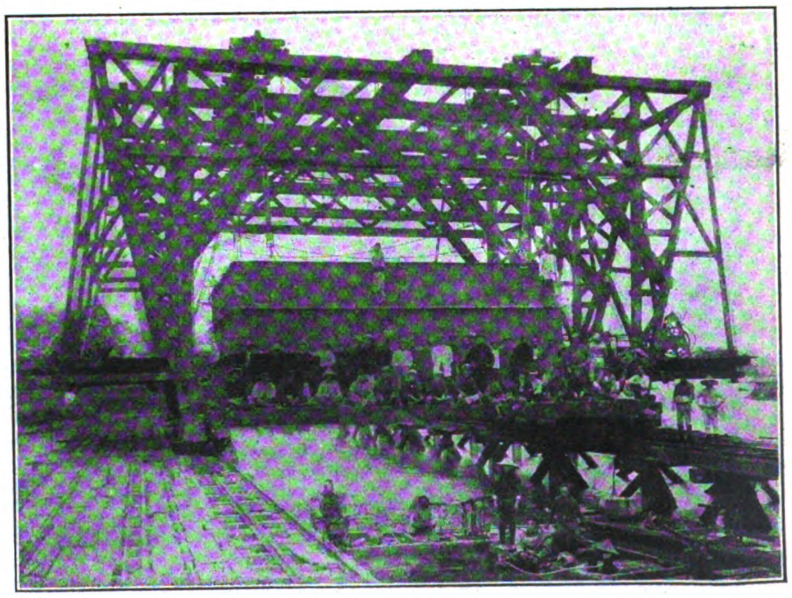
QUAY WALL AT SHO-KELUNG



QUAY WALL IN FRONT OF NEW RAILWAY STATION

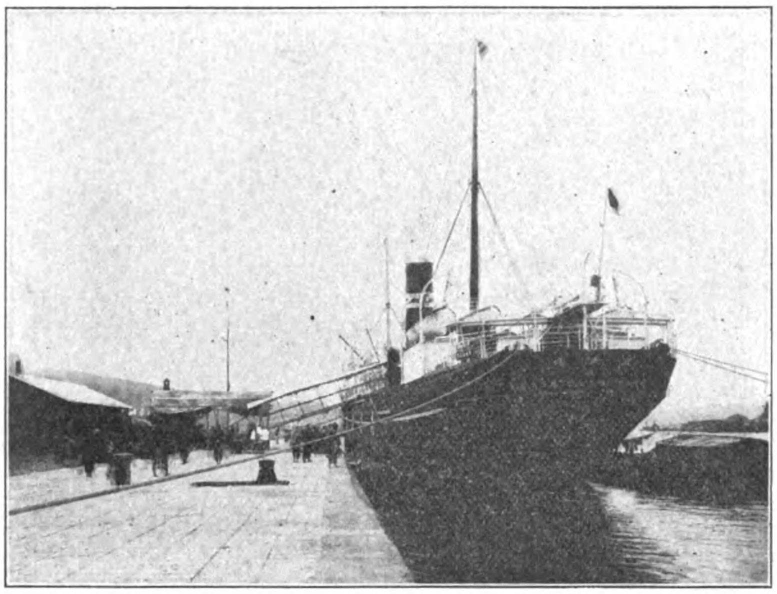


PORTION OF NEW QUAY WALL

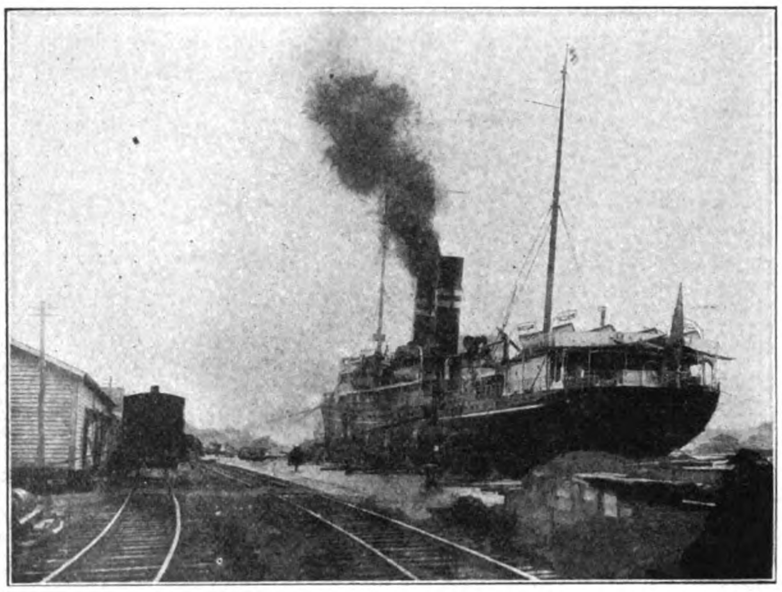


CONCRETE BLOCK SETTING TRAVELLER

VIEWS OF KELUNG HARBOUR WORKS



QUAY WALL IN FRONT OF NEW RAILWAY STATION



QUAY WALL IN FRONT OF RAILWAY GODOWNS

for a distance of 2,460 feet; at Sho-Kelung, 5,220 feet; at Gyuchoko, 732 feet. Along these walls 10 landing steps and numerous mooring buoys and rings will be provided for the small-boat and sampan traffic. The bottom of the sea between the old and new railway stations is to be dredged to the extent of 2,400 feet, with a depth of 30 feet at low water.

Two small islands, Haukan and Haubo, in front of the old railway station, are to be blasted and dredged 30 feet below low water. All submerged reefs within steamers' anchorage will be removed. Ten buoys will be installed along the fairway to indicate the course; also, to afford a safe anchorage for steamers, 10 moorings will be provided in the inner harbor. Sheds and warehouses, provided with cranes, will be erected along the quay wall to facilitate the discharging and loading of cargo. A protecting sea wall 1,100 feet in length will be constructed at Senton-Bi (Senton Point), where an area of 3 or 4 acres will be reclaimed. It is expected that this wall will afford a safe anchorage for vessels inside the point.

By the completion of the harbor works, a water area of 17 acres, with a depth of 12 to 30 feet at low water, will be secured inside the point for anchorage of steam launches and junks; also an anchorage of 100 acres, with a depth of more than 30 feet at low water, will be provided inside the point, where five steamers, ranging from 3,000 to 6,000 tons may be accommodated alongside the quay wall and eight steamers of the same size at mooring buoys. Besides these, an area of 45 acres will be available for general anchorage. The sea bottom near Senton Point will be left in its present state of shallowness, except for the dredging of a fairway 480 feet wide to connect with the inner harbor. This shallow water, together with sea wall to be constructed at the point, may break the force of waves and protect the inner harbor.

To carry out these works, the following budget had been prepared and was approved by the Imperial Diet: Salaries, wages, and office expenses, $364,273; shore equipments, $1,586,960; dredging and removal of submerged rocks, $550,000; buoys, $40,00; vessels and various machinery, $332,500; land and houses, $131,500; investigation and petty expenses, $44,516; various buildings, $50,251; total, $3,100,000.

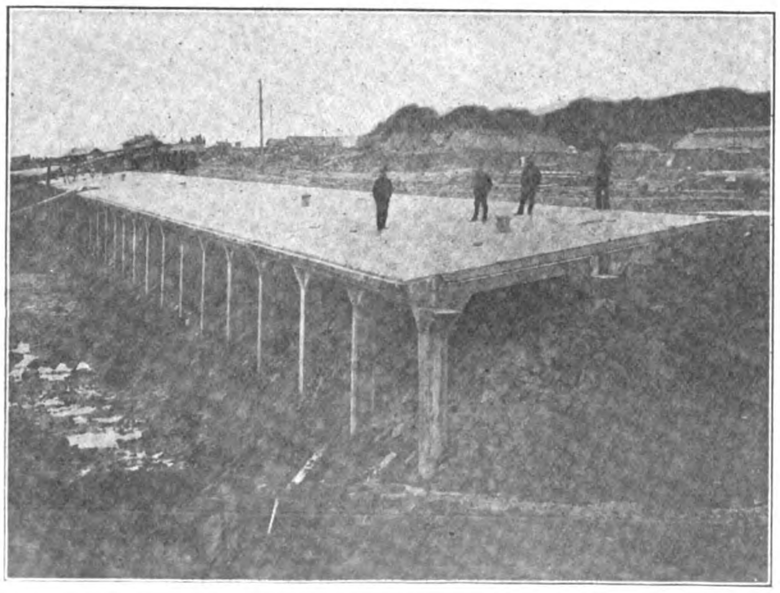
What Has Been Accomplished.—With the plans and the budget as outlined above the harbor works at Kelung are now making fair progress. The following is a review of the work of the second period accomplished during the 4 years, from April, 1906, to March, 1910.

A quay wall of 720 feet in length, with a height of 10 feet above low water of spring tide, has been completed in front of the new railway station, where the *Kama Kura-maru*, a steamer of 6,000 tons, came alongside for the first time in February, 1909. Since then all the regular mail steamers that ply between Kelung and Kobe are accommodated at this quay, giving improved facilities for the passenger and freight traffic. A quay wall 2,770 feet in length, with a height of 5 feet above low water of spring tide, has been constructed along the shore between Dai-Kelung and Sho-Kelung, for steam launches and junks.

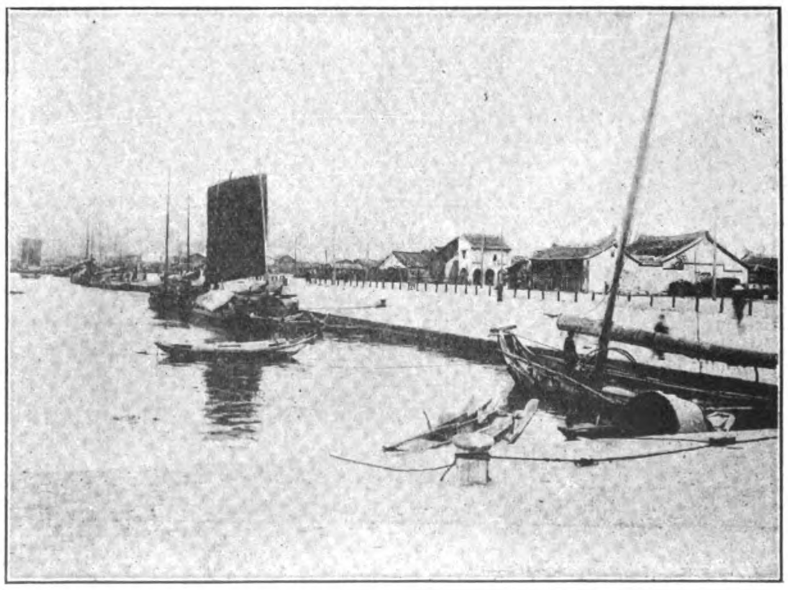
Two small shallow and polluted streams that formerly drained the streets of Dai-Kelung and Sho-Kelung, have been improved and converted into a canal of 1,770 feet in length, with a width of 90 feet and a depth of 4 feet below low water of spring tide. Along the bank of this canal, 3,144 feet of retaining wall were constructed, and five wooden bridges span the canal. Seventy-two acres of water area with a depth of more than 30 feet, and 44 acres with a depth ranging from 12 to 30 feet at low water have been obtained as the fairway and anchorage. An area of 4 acres was reclaimed at Gyuchoko to be used as a general landing yard; also reclaimed land covering 3 acres has been secured along the quay wall that runs between the old and new railway stations.

Of the vessels purchased in the first period a dredger and 3 steam launches have been transferred to the Takao harbor works, 3 barges and 2 steam launches to Tamsui, and a steam launch to the water police department, so that only 1 dredger and 5 steam launches are available for the work at Kelung.

(CONSUL GENERAL REAT, TAMSUI.)



TEMPORARY DAM, FOR CONSTRUCTION OF QUAY WALL



QUAY FOR STEAM LAUNCHES AND SAMPANS

THE BOMBAY WATER-WORKS

The water supply of Bombay is from three artificial lakes which depend upon the rainfall during the monsoon season, reports U.S. Consul Edwin S. Cunningham from Bombay. These lakes are located at various distances to 55 miles from the city and the water is conveyed through main pipes to reservoirs in Bombay, thence distributed to supply the requirements of the population.

Vehar Lake water was first introduced in 1859, and augmented by forming of Tulsi Lake in 1879, which was again supplemented by the Tansa waterworks in 1892. The total expenditures thereon have been $91,462. The combined water supply of 31,500,000 gallons per day is quite inadequate for this growing city. The necessity for an increase in pressing. During recent years the monsoon is watched with great anxiety as the waterworks during these late years have not been in a position to meet the results of a bad monsoon or to make up the deficiency of rainfall from reserves.

The hydraulic engineer last August submitted an exhaustive report with recommendations for increasing the water supply. His plan as developed and considered by the municipality is to complete the Tansa scheme by increasing its capacity by raising the dam and extending the area of drainage. This reports considered minutely the various expenditures and the necessity of acquiring certain properties and removing villages from the catchment area aggregating an outlay of $2,994,000 to $3,567,000, and increasing the water supply by 18,500,000 gallons daily.

The report carefully analyses the amount to be expended for the various items. The item of importance to the American manufacturer is the duplicating of the mains, and is mentioned as duplicating siphons Nos. 1 to 7 in steel at an estimated cost of $765,000, and duplicating siphon No. 8 in steel and cast iron $918,500. In the event that the siphons are duplicated in cast iron throughout, the statement estimates the additional cost to be $661,700 owing to high cost of transportation for the heavier cast-iron pipes. Steel mains have been recommended over a certain part of the pipe lines, which are between the lake and Ghatkopur. The executive engineer says:

The advantage of substituting a steel main for the proposed 48-inch cast-iron main in the pipe line north of Ghatkopur is obvious and the result will be a material saving in cost. The weight of the steel main will be only about one-third that of cast iron, the first cost will be less, transit cheaper, handling easier the joints fewer, the execution of the work more rapid and experience goes to prove that there will be no additional risks on account of corrosion. The use of steel as suggested will, in respect of the size and situation of the pipes, be in accord with modern practices.

The expenditure for the proposed main is to be met by long loans. The plan of the hydraulic engineer has been carefully considered during the last few months by the special commission of the municipality and has, to a certain extent, been approved. An expert has been employed for the purpose of making a final report on certain matters connected with the scheme, and it is expected that he will have completed his work by the end of June, this year. In the course of events the municipality will have finally acted very soon thereafter. All that can be said now (May 31) is that the importance of increasing the water supply is keenly felt by all in authority.

The plan as submitted is considered by many as the only feasible one for increasing the water supply of Bombay. Much will depend on the report of the expert, but the general plan of doubling the conduits will be necessary should developments of any kind be adopted. It will be wise for American manufacturers who are interested in supplying the material necessary for laying water mains to place themselves in a position to consider the question of bids when called for.

MINING

Tanshanwan Coal Mine.—The Tanshanwan Coal Mine has at last been pumped out and has begun work. Attempts have been made for 15 years to work this mine, and probably a million taels have been put into it. Now that the water is under control, its working presents no special difficulties; and as a light railway will give easy transport to the river, its prospects are good, as it lays an anthracite coal on the market at $10 a ton.

Fushun Coal.—The western part of the Korean Peninsula abounds in all kinds of mineral products, including a variety of coals, anthracite, bituminous, and lignite. Pingyang produces the finest coal, which is popular with the warships, but somehow has only a slow demand as either a fuel or for heating purposes. Anshu coal is bituminous, but is worked under private management on an inconsiderable scale. As it is, Kyushu coal retains a dominant hold on Western Korea.

Fushun coal was used experimentally by the Korean Railway Administration on its trains for the first time last year, and satisfied the authorities of its greater suitability as a fuel principally because of its high calorific power. Besides, it is quoted cheaper than Kyushu coal, and these advantages are recommending it heartily to the public favour in Western Korea. The gold mines operated under foreign management are now using Fuhsun coal almost exclusively.

Kaying Coal Fields.—That there is a considerable quantity of coal in the hills in Kaying Subprefecture in the Swatow district has been known to the natives for many years reports Consul C. L. L. Williams of Swatow. However, beyond a few surface workings, no attempt has been made to mine.

It is reported in the native papers that some time since certain of the gentry and merchants of Paokan, Kaying, filed an application to work these mines in a modern manner. The head of the prefectural industrial bureau was instructed by the executive to make a "survey," by which is meant apparently a surface survey to determine the ownership of the land on which the workings would be located, but he returned from the fields without accomplishing anything beyond compiling a list of men, presumably landholders, who objected to the proposed workings. He then notified these obstructionists that he had appointed two deputies to make the survey. The deputies, however, made the surveying without giving the obstructionists a chance to appear. This makes it doubtful if any progress can be made with this scheme in the face of local opposition.

The principal commercial difficulty in working these mines is in the lack of adequate transportation facilities. At present water transport for small boats drawing not over 18 inches is available to within some few miles of the hills. The district does not lie far, however, from the proposed route of the Canton-Hankow trunk line, and should this undertaking mature a short spur line might be built to the fields. (C.R.)

WATERWORKS AND IRRIGATION

New Reservoir, Yokohama:—Construction of the new Yokohama waterworks reservoir at Nishiyamura was begun on June 12. The compound of the new reservoir is very extensive, with 8 filter beds, each of 3,515 square yards, or 28,120 square yards in all, capable of filtering about 405,000 koku (19,301,045 gallons) of water a day. The reservoir is to have a capacity of 185,000 koku (9,216,526 gallons).

One of the welcome innovations incidental to the extension of the work is that the supply of water for the bluff of Yokohama will be obtained from the new reservoir, which, being situated at a place higher than the present one, water pressure will be increased. This will give a much desired protection in case of fire. For years the bluff residents have complained of the lack of pressure, not only in case of emergency but even in ordinary times in the summer season.

The ambitious plan nearly to quadruple the capacity of the present water system of Yokohama is thus now well under way. The estimated cost of the improvement is $3,500,000; and it is hoped that it will be completed by March of 1915. The present water supply capacity per day is 870,000 cubic shaku (6,395,718 gallons), which is expected to be increased to 3,200,000 cubic shaku (23,524,480 gallons). This volume is considered sufficient to supply the need of 800,000 residents. The present population of Yokohama is little more than 400,000.

The present reservoir at Noge Hill in Yokohama being inadequate to receive the increased supply, a new reservoir has been planned on the high ground at Nishiyamura, in Tsudzuki-gun, a few miles from Yokohama. This new reservoir is to be on a much larger scale than the present one at Noge. Moreover, the location of the new one is higher than the present one, it being 240 shaku (239 feet) above the sea level, whereas the present one at Noge is 160 shaku (159 feet).

At present water from the intake to Yokohama comes through one 20-inch pipe and one 15½-inch pipe. This being insufficient, one new 36-inch pipe is being laid according to the extension program.

INDUSTRIAL

Sugar in Formosa.—According to the latest returns the output of Formosa sugar (molasses) for the next term is estimated as follows:—

Companies	Area of plantations ko	Estimate piculs
Taiwan	14,400	600,000
Ensuiko	7,000	300,000
Meiji	6,000	260,000
Dainihon	8,500	270,000
Toyo	5,800	240,000
Niitaka	5,500	260,000
Teikoku	3,000	160,000
Hokuko	4,300	140,000
Rinhongen	2,300	80,000
Chuwo	2,200	80,000
Taihoku	1,000	60,000
Toroku	2,500	80,000
Shinko	1,360	60,000
Minami Nihon	1,010	25,000
Horisha	980	40,000
Eiko	800	20,000
Taito	200	6,500
Total		2,671,500

Beet Sugar in Korea.—A project is on foot for the formation of a company to manufacture beet sugar in Korea. It is now stated that in Tokyo alone more than half the entire stock has been subscribed for. The remainder will be taken up by the promoters and supporters in the Western provinces and Korea, and it is expected that there will be no shares available for the general public. According to the present programme, the first payment on company's stock was to be made by the end of September, and Korean sugar refined by the company will be on the market towards the end of next year.

BUILDING

Reconstruction of Hankow:—Mr. M. B. Yang, a Chinese Civil Engineer, who graduated at Yale, and Columbia, arrived at Hankow in order to undertake the reconstruction of Hankow. Negotiations were reported on August 22 to be still proceeding with the Robert Dollar Syndicate for a loan to cover the cost of the reconstruction of Hankow, and the Hupeh Government has been asked to

guarantee the full amount of three to four million pounds sterling which will be forthcoming without depending on the issue of bonds.

The Philippine University.—After two attempts to secure reasonable tenders for the construction of the first building of the Group for the University of the Philippines, the government has authorized its construction by the Bureau of Public Works, and Work has now been started.

University hall, as this building is to be known, is one of five which will, in the future comprise the University of the Philippines. These five buildings are arranged as follows: The four large ones, each on the corner of a quadrangle with a smaller, or administration, building, in the center. The building now going up is situated on the southeast corner of this court. It is to be finished by June 2, 1913, or in 300 days, and is to cost P250,000 the amount appropriated for its construction. So far the only work done has been on the foundations, which are of the spread footing variety entirely of concrete and steel. The whole building is practically a steel one, encased in concrete. The structural steel used will cost in the neighborhood of P 30,000.

All the heavy manual labor, the handling of cars and the mixing of concrete will be performed by electricity. The concrete mixer, a big steel affair of the Smith number 2½ variety, is now being put in place. All foundation work will be finished by the end of the present month and then the big three story steel and concrete building will be erected. It will be 67 meters long by 25 meters wide and 15½ meters high from foundation to eaves. The 2 meters can be added for the roof, which will be of iron with patent interlocking tiles. No wood will be used whatever in the building except for the doors and windows, even the floors and ceilings being concrete.

The steel frame of the building makes it practically interlocking, and if there should be a tendency on the part of one portion to sink, the strain will be evenly distributed.

The work of construction is under the supervision of J. McGregor, an engineer in the construction division of the Bureau of Public Works. Mr. McGregor has been in the bureau since 1910, but before that had been in China, in charge of the erection of buildings and construction of railways for the Chinese government, for eleven years, having started in that country in 1899 never leaving until he came to the islands over two years ago.

LIGHT AND POWER COMPANIES

Yingkou Hydro-Electricity Co.—The demand for electricity service at Yingkou has increased rapidly and the lighting service, calculated on the unit of 10 candlepower lamp, now supplies to 9,000 lamps, compared with only 6,000 of them at the end of last October. The management, facing the necessity of being prepared for a further increase of demand, proposes to instal an extension of its power station in order to raise the supply capacity up to about 25,000 lamps. The funds required for the proposed extension are to be raised in a loan to the amount of about Y100,000.

The Company has been placed on a strictly business footing since the S.M.R. Co. bought the majority of its shares and undertook its management. The last statement of accounts shows that the business returns for the first working term after the reorganization are by far the best of all, and, although the net profit was not sufficient to justify a dividend for the shareholders, yet not an inconsiderable amount could be set aside, even after payment of the interest on the existing loans, which reach about Y500,000 borrowed in almost equal amounts from the Yokohama Specie Bank and the S.M.R. Co.

Proposed New Electric Railway Lines. India.—Bangalore, in the Native State of Mysore, ranking among the more important cities of southern India, does not possess a tramway system, but the Mysore Government is considering building approximately 10 miles of electric lines in the city and cantonment sections, with branches to outlying suburbs, Malleswaram, Basabangudi, and Frazertown.

The track proposed is one meter (3.28 feet), and tenders have already been received from firms in the United States to cover track material, car equipment, and necessary electrical apparatus for substation and cars. Definite action may be taken within a short time, possibly this year.

Another important city without a street railways is Hyderabad, capital of the great Native State of that name, immediately north of the Madras Presidency. Hyderabad has 500,623 population, and a modern electric tramway system is one of the greatest needs of this rich capital. It is believed that such a project, with proper management, would prove feasible and profitable. (C. R.)

Manila Electric Railroad and Light Co.—The Manila Electric Railroad and Light Co. submitted to the municipal board the following proposed schedules for electric light rates to become effective in January, in response to a request from that body:

Straight monthly rates: per k. w. h.: first 50 k. w. h., 35 centavos; next 200 k. w. h., 30 centavos and above 250 k. w. h., 20 centavos.

Alternative proposal: Installation charge, 20, 30, and 50 per light according to candle power the maximum price charge being for 100 c. p. metallic filament and 32 c. p. carbon filament. Current charge, first 50 k. w. h. per month, 25 centavos per k. w. h.

Yokohama Electric Light Co.—An increase of the stock issue of the combined Yokohama Electric Light Company and Yokosuka and Yenoshima Electric Light Companies, has been planned. The project is to dispose of 6,600 new shares, the advance payment on them to be 20 yen each. The new issue is to cover the expense, among other things, of the erection and equipment of a 5,000 kilowatt service for Mineimizu, which will necessitate a new power house on the reclaimed ground at Kanagawa, plans for which are already in hand.

Lucena Electric Light, Ice and Water Co.—A group of Filipino citizens of the city of Lucena, Tayabas, have filed papers of incorporation with the executive secretary for the Lucena Electric Light, Ice and Water company, capitalized at P50,000. The new company is headed by Freilan Lopez, president, Valentine Racela, vice president, and Fortunato Lavares, secretary treasurer, all prominent citizens of Lucena.

In its franchise the company is authorized to construct, maintain and operate electric light plants, ice plants and such subsidiary industries as may be required in the conduct of the business. It is reported that the new corporation will begin work immediately upon their plant, which will be in operation in four months after the work is begun.

RIVER AND HARBOR IMPROVEMENTS

Saigon Harbor Improvements.—In October, 1899, the Higher Council of Indo-China took up the question of improving Saigon Harbor, and eight months later the Governor General ordered an investigation of the work needed. Plans were drawn up, and were approved by the Saigon Chamber of Commerce, which asked that the work be pushed. The Higher Council in 1900 also approved the plans, which included the following items, with estimated cost of each:

(1) Construction of quay, 3,385 feet long, on right bank of Saigon River from old mill of Kien-Fat-Seng & Co., to approaches of South Fort; cost, $1,209,754. (2) Construction of docks parallel to quay; cost, $175,086. (3) Construction of railroad lines in front and behind docks, and connection with Saigon-Mytho Railroad: cost, $261,068. (4) Construction of a branch connecting with the Mytho Railroad just beyond Cholon and tapping the rice mills in both banks of Arroyo Chinois: cost, $261,068. (5) Establishment of anchoring posts outside channel on left bank of Saigon River; cost, $10,300. (6) Construction across Arroyo Chinois, at prolongation of rue d'Adran, of a turning bridge for ordinary traffic and for passage of a tramway which should run between Saigon and wharves; cost, $85,966. (7) Construction, on left bank of Arroyo Chinois, of an inclined way leading up to a platform 82 feet wide and about 2,952 feet long, for use of river boats and barges; cost, $156,787.

Bids for the quay were called for at once, and in 1901 La Société Levallois-Perret, the same firm that built the famous Eifel tower in Paris, was granted the contract, at $1,505,400. The increase over the estimate resulted from adoption, by the committee in charge, of a plan calling for masonry only, in place of a platform of steel and brick arches supported on masonry piers as in original estimate.

The quay, after this change, was to consist of a wall from 12 to 16 feet thick, supported on piers 16 feet wide and 47 feet from axis to axis. This wall was to support and protect a platform constructed of earth on a foundation of rocks raised 1 foot 4 inches above highest tides. The platform was begun in 1905. Shortly after completion of first section in July soil settling seriously displaced the wall.

The piers were built on a very compact bed of argil, and it was thought that the wall would withstand the static push of the platform behind it. The latter was built directly on the natural soil, which consisted of a thick mud, with the idea that there would be a gradual settling of the whole platform as more earth was placed on top. Costly experience having disproved this theory, it was decided to revert to the original plan in which the platform of rock and earth was placed by a platform of reenforced concrete arches resting on the one side on the wall already constructed and on the other on a series of piers to be built behind the wall. The expense of this new plan was estimated at $1,254,500, and a new contract was made with the Levallois-Perret firm.

To-day the quay is completed, the anchoring posts are in place, and the turning bridge is in use, but there are no docks or other shelter for merchandise along the quay, the approaches to the quay have yet to be built, including the railroad connections, and there is no landing stage for use of river boats and barges.

The necessary funds not being available from the budget, the Government was forced to devise other means, and in November, 1910, the Governor General established two new taxes to be collected on rice and its derivatives exported from Saigon. The amount of these taxes for one year, estimated at about $70,000, is to be applied solely to the Chamber of Commerce of Saigon and to supply Saigon Harbor with needed equipment. Unfortunately, however, with the increasing need for funds has come a series of bad years for rice crops, so that the amount realized from the two taxes has fallen far below the estimate and the harbor works have suffered accordingly.

The first shed for storing cargo from or for steamers tying alongside the new quay is about to be erected by the Compagnie des Chargeurs Reunis, one of the two French steamship companies trading in the Far East. This building is to be 197 feet long and 39 feet wide, with the necessary outhouses, and will be built 66 feet from the edge of the quay. The plan for the building is the work of the Public Works Department, but the expense of construction and maintenance will be met by the company, which will then be free from all charges for landing or storing of merchandise. The cost is estimated at about $2,300, and the company has agreed to surrender the building to the authorities upon demand, the Government to

repay cost of construction, minus an allowance for usage. In case the two parties cannot agree upon the price, an expert is to be secured.

Without adequate provision for sheltering goods from the sun and rain, the new quay will be of little value. Steamers tie up alongside it now, but they take on their cargoes from lighters which come alongside on the stream side. Several hundred thousand dollars must be spent on further improvements before the full benefit of the present work can be realized. Efforts are now being made to increase the appropriation in the budget for these improvements, which, if ever completed, will give this port a creditable system and greatly facilitate loading and unloading steamers. (C.R.)

Floating Dock, Soerabaya:—A steel pontoon floating dock for the Droogdok Maatschappij Soerabaya of Amsterdam was launched on June 21 at Port Glasgow, Scotland. The dock, which is named Soerabaya I, is designed for vessels up to 400 feet in length. The outer extremities of the pontoon are built in the form of a bow. They are lengthened by platforms. The top deck of the side walls is sheathed with teak. Two docking and painting stages are fitted on the inside of each of the side walls. The pumping machinery is electrically driven. Self-indicating floats have been provided, showing the water level in each compartment, and the dock is fitted with a complete system of mechanical shores, electric capstans, controlling valve levers, keel blocks, portable bilge blocks, etc., while at one end gates have been fitted to form a bridge from side to side. These can be used also as cranes for dealing with heavy weights. After the trials have been carried out the dock will leave under tow for Soerabaya, Java, via the Suez Canal.

New Dry Dock in Borneo:—An important event in the history of the Public Works Department and the progress of Sarawak, in Borneo, took place on May 31, when the dry dock was formally opened. The dock, which was commenced at the end of 1908, has taken just over two years to build, work having been stopped for nearly a year. The dock is capable of holding either the *Kuching* or *Rajah of Sarawak*. (C.R.)

HARBOUR WORKS

Proposed Water-gate at Shuangtaitzu.—The proposed construction of a water-gate at Shuangtaitzu, at 79 miles above Yingkou, where much of the river water of the Liao is diverted into a tributary which joins the main river at that point, has been abandoned. Mr. Hughes, Chief Engineer in charge of the construction work of Lienshan Harbour, drew up a plan for the water-gate at the request of Taotai Yuan of Newchwang, and the Taotai was about to start work, with the approval of Chao Erh-hsun, when the inhabitants along this tributary united themselves in an antagonistic movement, and threatened to create trouble unless the scheme were dropped altogether. They profess that they much depend on the tributary for their sustenance, and moreover that the prevention of the water from flowing thereinto by means of the water-gate will deprive them of the chief factor of their livelihood. This stout opposition has led the Governor to enquire further into the matter and to rescind his approval previously given to this proposition.

Port Arthur.—The appropriation for the construction of roads, bridges, and drains in Port Arthur on an eight year's programme beginning with the fiscal year 1908 amounts to Y 1,632,700. Of this sum about Y 230,000 was defrayed during the four years ended on March 31 last. According to the original plan the balance of the appropriation was to be disbursed during the remaining four years in sums ranging from Y 150,000 to Y 430,000 a year. This plan was reversed at the beginning of the present fiscal year, and the amount of annual disbursement for the above-mentioned purpose has been reduced to Y 20,000 uniformly, which sum being considered as absolutely inadequate to carry out the construction work on the existing plan, it is expected that the whole programme itself will be suspended from execution at the end of the current fiscal year.

SHIPPING AND SHIPBUILDING

Shipbuilding and Shipping, Japan:—There are 230 shipbuilding yards in Japan, not including junkbuilding establishments, a decrease of 9 compared with 1910. For the last year, covered by available authentic statistics, these yards turned out 77 steamers of 24,479 tons and 147 sailing vessels of 11,097 tons. This is a decrease of 58 sailing vessels from 1910, but an increase of 10 steamers, the tonnage of the latter, however, decreasing 38,996. This record does not include a number of new steamers since completed or authorized, which tend to strengthen Japan's North American and European lines. All of Japan's leading steamship lines are preparing to build additional steamers for the foreign service, mostly medium-sized freight and passenger craft. Japan's total shipping now includes 2,545 steamers, of 1,233,909 gross tons; 6,392 sailing vessels, of 413,720 gross tons, and 22,463 junks, of 31,413,710 cubic feet.

Four steamers, having a gross tonnage of 15,817, were completed during the past year under the law for encouraging shipbuilding. The subsidized steamship lines now number 24, which operate on most commercial routes throughout the world, except those on the Atlantic Ocean. With the completion of the Panama Canal, Japanese steamers will probably visit the Atlantic seaboard, particularly in connection with the extensive raw-cotton freight traffic.

Philippine Customs Cruiser:—Bids will soon be invited for the construction of a revenue cutter for the customs authorities that will have a speed of sixteen knots. It will be equipped with an auxiliary launch and a motor boat each having a similar if not greater speed. This vessel is necessary in order that the active smuggling in southern waters may be abated. The collector of customs has recommended the purchase of such a vessel in his last three annual reports but the money necessary to cover the expense was never made available. Act No. 1954, appropriated P60,000 for the purpose but that amount was far from sufficient to secure a vessel of the size and speed required. The balance of P100,000, however, has been made available from savings made from the appropriations for the bureau by economical administration.

FINANCIAL

London, Singapore and Java Bank.—The London, Singapore and Java Bank has been registered with a capital of £50,000, in £10 shares, to carry on in Great Britain, Europe, the Dutch and British East Indies or elsewhere, the business of bankers, financiers, financial agents, money changers, bill brokers, discounters, underwriters and guarantors, etc. The subscribers are:—G. St. L. Mowbray, 23, Suffolk-street, Pall Mall, S. W., and F. N. Varney, 17 Caversham-road, Kingston-on-Thames, secretary. It is a private company, and the first directors are G. St. L. Mowbray and A. Berry.

China Mutual Life Insurance.—According to the annual report of the Directors of the China Mutual Life Insurance Co., Ltd., new applications received during the year amounted to $12,751,774. Policies were issued for $11,249,562 and applications for $1,502,212 were postponed or declined. The total insurance in force on 31st March, 1912, amounted to $43,199,946, of which policies to the amount of $210,411 were re-insured. The income for the year amounted to $4,172,657.76, being an increase for the year of $204,776.56. The total assets now amount to $11,301,067.53, an increase during the year of $1,157,645.93. The total amount paid to policy-holders and beneficiaries during the year amounted to $1,678,769.18, making a total of $7,086,642.26 paid since the Company's inception.

A New Bank.—A plan has been formed in Japan, it is reported, to establish an exchange bank with a view to furthering the foreign trade and exchange transactions of the country. The chief promoters are Mr. Buyei-Nakano, president of the Tokyo Chamber of Commerce, Mr. Soichiro Asano, president of the Toyo Kisen Kaisha, Mr. Kenji Imanishi, Manager of the Yokohama Specie Bank, and several other influential business men in Tokyo and Osaka. According to the plan the bank will have a capital of either 5,000,000 or 10,000,000 yen and will make itself an organ for small traders, directing its attention to the field untouched by the Yokohama Specie Bank, which is the only bank to accommodate those engaged in external trade.

American Enterprise.—Until quite recently the Tasmanian government made it an invariable policy to permit none other than British or Australian manufacturers to compete in tenders for supplies, and to purchase nothing in any other country that could be obtained in Great Britain or Australia. However, in October, 1911, the Tasmanian railways were placed by the state parliament under the control of a commissioner, who is to hold office for four years, and have full authority to operate the railway system on business principles, and independent of any political considerations. Shortly after assuming office some steel rails were purchased in England through the agent general in London, and with regard to the tenders having as usual been restricted to British manufacturers, an American firm wrote to the new commissioner to the effect that it could have landed the rails in Tasmania at about $3.60 per ton cheaper than the price at which they were supplied from England. The commissioner wrote in reply that the next time any steel rails were required, American as well as English firms would be given the opportunity to submit bids.

New Germinal Tobacco Factory:—On September first the Germinal Cigar and Cigarette Factory, was to begin the construction of the largest concrete building yet planned for Manila.

The new building will be located on 3,500 meters of land which lies alongside of the present factory building, and has a frontage of 35.5 meters. It will be four stories high and fitted with electric elevators, overhead electric conveyors, and all other appliances that will increase the speed, and lessen the cost, of handling large quantities of tobacco.

The building will be used entirely for the manufacture of cigars and cigarettes and will be modeled and fitted after the very latest factories in Germany, Cuba and the United States. The cost is estimated at P. 140,000.

If the present plans of the company are carried out, as soon as the factory is completed, the old factory will be torn down and the new building extended over to the Ayala bridge at an additional cost of about P 150,000.

Mr. Delmar Smith-Clinton is the contractor in charge of the preliminary work, and piles are now being driven for the foundation of the new building.

The Germinal Company will also build a new concrete factory at Malabon for the manufacture of cigars only.

Bids for the new factories have not been awarded, but will probably be let soon.

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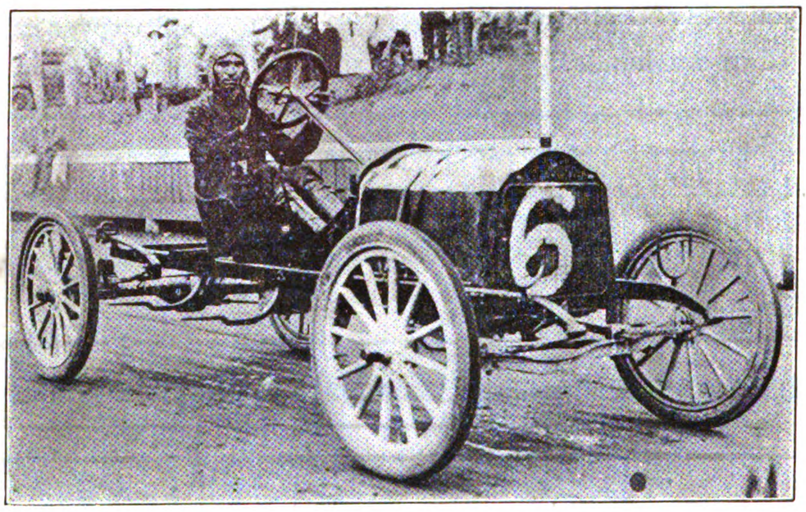

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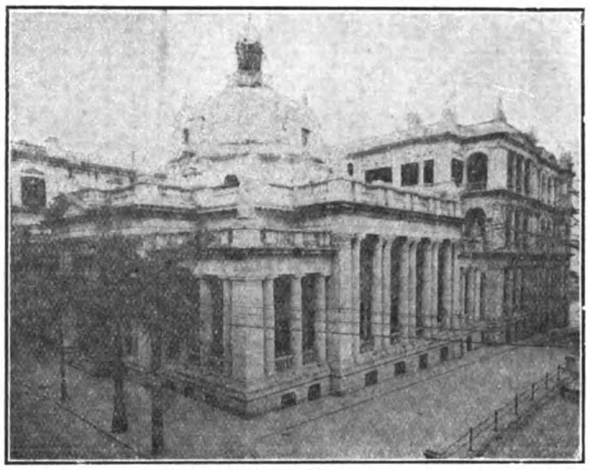

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, OCTOBER, 1912 No. 5.

CHINA'S FINANCIAL CONDITION

THE CRISP LOAN AND CHINA'S CREDIT

Some of the main issues in connection with China's financial condition have been obscured by the dust of disputation that has been raised in regard to the Crisp Loan of £10,000,000, a moiety of which was floated in London at the end of September. It is desirable, therefore, that a calm and dispassionate statement of the present condition of China's finances, with a brief retrospect of China's financial history since the establishment of the Republic, should be presented to the reader to enable an impartial judgment to be formed in regard to China's credit and her financial prospects for the future. We are, fortunately, in possession of information from authoritative sources, not generally available, that will largely assist in throwing light upon points that have hitherto been shrouded in uncertainty or that have been overlooked in the acrimonious disputation that followed the conclusion of the loan floated by Messrs. Birch Crisp & Co.

Readers of the FAR EASTERN REVIEW will remember that in our Financial and Historical Review of the Chinese Revolution, published last April, we showed that the rock upon which the Manchu Dynasty split was finance. Had Yuan Shih-k'ai been enabled to borrow money from foreign sources it is extremely doubtful whether there would have been a Republic in existence to-day. On the other hand had financial support been withheld from Yuan Shih-k'ai and given to the Revolutionaries the latter would almost certainly have carried the war into the North, and the final settlement would have been much less favorable to the Manchus. But neither side had the funds requisite for a protraction of the war, and the Customs revenues being very wisely made unavailable either to the Imperialists or the Revolutionaries (to which important point we shall revert in due time) a continuance of hostilities became practically impossible, and peace was concluded. No purpose would be served by recapitulating the various financial expedients adopted by each side during the conflict except to note that the Nanking Provisional Government issued a number of eight per cent. bonds which became a charge on China when Yuan Shih-k'ai's appointment as Provisional President was confirmed on February 15.

The new Government under Provisional President Yuan Shih-k'ai, which was established after Dr. Sun Yat-sen and his associates at Nanking had resigned, was faced with innumerable problems, not the least being the necessity of disbanding the troops that had been raised during the Revolution, and re-establishing the shattered machinery of administration. But the Treasury was empty. The contributions from the Provinces upon which the Central Government had been wont to rely had ceased, and it was realized that for many months to come it would be impossible to depend upon any return from internal taxation sufficient to meet the ordinary expenses of administration, much less the extraordinary expenditure involved by the maintenance of hundreds of thousands of soldiers who could not be disbanded as their pay was in arrear; to say nothing of the payment of the Indemnity and the service of foreign loans. To disband the troops in those circumstances would have been to flood the country with dissatisfied and penniless men who would have been a serious menace to the new order. Foreign financial aid was the only way out of the difficulty. Active negotiations were accordingly entered into with the Four Banking Groups comprised of the Hongkong and Shanghai Banking Corporation, the Banque de l'Indo-Chine, the Deutsche-Asiatische Bank, and Mr. Willard D. Straight, representing the American Group. As a result of these negotiations Provisional President Yuan Shih-k'ai signed a letter on March 9, 1912, arranging for monthly payments to cover current needs, and giving the Group a firm option upon similar loans and a proposed reconstruction loan of £60,000,000. It should be mentioned that the Groups had already, on February 28, made an advance to the Provisional Government of Tls. 2,000,000. A further sum of Tls. 1,100,000 was handed over to the Provisional Government early in March, and negotiations were about to be opened on the final reconstruction loan agreement, when the Groups learned on March 14 that the Premier, Tang Shao-yi, was negotiating with a Belgian Group for an independent loan of £1,000,000. The Four Banking Groups protested, but the Belgian loan was accepted, and the Four Banking Groups thereupon suspended further payments.

Negotiations, were not, however, finally broken off, and it was hoped that an arrangement would be possible whereby the Groups, which had been augmented by the inclusion of Russian and Japanese, Banks, would be able to advance a sum sufficient to provide China with the funds necessary to pay off the troops and establish the administration on a firm basis. The Six Banking Groups, to safeguard themselves, demanded:

First, that the purposes for which the funds were required should be stated by the Chinese Government and approved by the Groups.

Second, that China should adopt a system of audit which would insure the effective expenditure of loan funds for the purposes specified.

Third, that the salt taxes to be hypothecated for the service of this loan should be administered either by the existing Maritime Customs organization or by a separate service like the Customs under foreign direction, thus safeguarding the proper administration of the security despite the possible continuation or recurrence of unsettled conditions in China.

These terms proved unacceptable to the Provisional Government and an endeavor was made to raise a Patriotic Loan among the Chinese. This failed, and the negotiations with the Six Banking Groups dragged on and small sums were advanced from time to time, the total reaching £1,800,000. China would not, however, give way in regard to the demands of the Groups, and matters reached a deadlock. Attempts had been made from time to time to arrange loans with foreign financiers apart from the Groups, but as it was generally known that the Governments of the six countries concerned gave their official countenance and support to the Groups, these endeavors were for a long time unsuccessful.

At last, however, an agent was found in Peking who undertook to secure £10,000,000 on the London market. The promotion of the loan was placed in the hands of Mr. C. Birch Crisp, of Messrs. Birch Crisp & Co. These negotiations, it may be mentioned, were kept secret in the earlier stages, and the International Group had no knowledge that a loan was being arranged on the security of the Salt Gabelle, the revenue of which was to be the security for the loan they were themselves about to negotiate with the Provisional Government. When Mr. Crisp was asked to undertake the promotion of the £10,000,000 Loan he went to the Chinese Legation in London and there talked the matter over with Dr. G. E. Morrison, the Political Adviser to China, who had just arrived in the British capital. The assurances he received from Dr. Morrison satisfied him, and he decided to proceed with the promotion. After ascertaining that the loan would be supported by the City he informed the Foreign Office that his firm contemplated concluding a contract with China. The Foreign Office in return notified him that they could not support the loan, and advised him to abandon the promotion. Mr. Crisp asked the Foreign Office to write him a formal letter asking him for reasons of State to abstain from negotiations. This letter was not given, and the contract, a copy of which we issued as a Special Supplement to subscribers on October 19, and now publish in this issue, was signed on August 30. Another interview with the Foreign Office authorities took place at which it was arranged that Mr. Crisp would not proceed to the issue of the loan without first notifying the Foreign Office. This notification was sent in due course, but no communication was received in reply from the Foreign Office. The loan was then issued. The public subscribed, for forty per cent. and the underwriters were left to take the remaining 60 per cent. The original intention was to open the loan on September 27 and close it on September 28, but the loan did not actually close until September 30. Usually China loans close in at most one and a half or two hours.

Pro and Con.

Having given a brief *resumé* of the history of the Crisp Loan we may consider the arguments advanced in its support and reasons given by those who regard it as involving a serious impairment of China's credit.

The supporters of the new loan declare that the terms and conditions offered and insisted upon by the Six Banking Groups could not be accepted by China on any consideration. For one reason Japan and Russia are in the consortium and one of their requirements was that no loan proceeds should be applied for any purposes in their respective spheres of influence in Manchuria, Mongolia, the New Dominion and Chinese Turkestan. Japan and Russia put forward this requirement as a condition for equal participation at the Conference of the six banks at Paris. They declared that they could not associate themselves with lending money to China to employ in the localities mentioned, and so necessitate expenditure, on the part of Japan and Russia. The Governments of Russia and Japan subsequently withdrew these conditions, but they are speciously declared by the Crisp Loan supporters to stand on record and to be more or less effective, whilst the agreement made among the Six Groups themselves for joint action in China stands terminable only by one year's notice. They allege, too, upon what grounds it is difficult to find, that the Bankers themselves broke their agreement with China, and not China with the Bankers; China, they argue, entered into the agreement with the Bankers for commercial purposes and never foresaw that political conditions would be imported into it. The actual claims made by the Groups supported by their respective Ministers were presumptuous, they state, and were as follow: (1). That the Groups should have the exclusive right to conduct China's financial operations for the next five years. (2). That the Belgian Loan of £1,250,000 should not be repaid from the proceeds of any loan entered into by the Chinese Government. (3). That the security should be the Salt Gabelle, placed under foreign control.

These conditions are held by the Crisp Loan promoters to be impracticable, and it is declared that no Advisory Council would ever agree to them, whilst Chinese nationalism would be destroyed by foreign supervision of the Salt Gabelle! This represents the point of view of those who welcome the new loan in the belief that it has secured China's independence of the Six Banking Groups!

On the other hand it is declared that China's best interests would be served by transacting all her business through the Six Banking Groups. In the present position of China's credit she has not sufficient security for the amount that it will be necessary for her to borrow. It will therefore be imperative to build up the revenues in order to provide a margin for future borrowing. The Groups desired to prevent over-borrowing. They desired to utilise their unique facilities in the money markets of the world to place Chinese Bonds at a price that would maintain China's credit. In order to maintain her credit, they felt, it would be necessary for the financial agents to have a certain general advisory capacity during the contract as it would obviously be prejudicial to China's credit if she used borrowed money for administration expenditure (as she must at present) and employed her revenues in ways that did not enhance the securities upon which her borrowing power is based. The Groups in effect said to China: "We will lend you what money you require, but it is necessary that your credit should be maintained. Your credit can only be maintained by an expenditure of your receipts from loans or revenues over and above cost of administration in such a manner that the value of the securities upon which your credit rests is enhanced. We must therefore be placed in a position to maintain your credit by preventing indiscriminate borrowing and wasteful expenditure." Control of the Salt Gabelle was asked for to give permanent security easily assignable in case of trouble. In former days the security given for various loans was not assignable but the conditions then were different. There was a dynasty which had responsibility and was believed to be a permanency. The present Government has little responsibility and in regard to its permanency opinions differ. In the old days the credit of the Chinese Government was built upon the foreign-controlled Maritime Customs and was very high. During the Revolution it was noted with surprise in some quarters that China's credit judging by the price of her Bonds had not suffered. This was simply because the Banks allowed no coupon to go by default and the Maritime Customs was the base of China's credit, and, being under foreign control, the revenues could not be seized either by the Revolutionaries or the Imperialists. Had the Maritime Customs been under Chinese control the southerners would have grabbed all the revenues in the portion of the country under their jurisdiction, while the Imperialists would have seized those in the north. The result would have been an indefinite protraction of the war, with a continuance of bloodshed and disorder, and the eventual bankruptcy of the country. That they now keep in view and in order to safeguard investors in any new loan they decided that the security must be such that no second revolution could cause it seriously to depreciate. Foreign control of the Salt Gabelle was, they deemed, the only method by which the interests of the bond-holders could be thus protected. A point that must not be forgotten is that the Six Groups were prepared to issue a loan within the present year up to £20,000,000.

MR. HSIUNG HSI-LING

EX-MINISTER OF FINANCE WHO NEGOTIATED THE INDEPENDENT LOAN AGREEMENTS

The claim is made that if any Group is altruistic it is the Six Groups. Their prestige in the money markets of the world would not permit them to issue any bad bonds. The Groups wish to make China strong and substantial; they do not want her to be in tutelage. The Banks in the Group are looking for returns in the shape of the business from a reorganized and prosperous China, not profits from loans. Their desire is to build up prosperity so that they may have permanent business. The Groups proposed to issue Bonds after the first issue at a fixed commission and the ultimate price to the Chinese Government would be regulated by the price of the Bonds and not by the commission. The Groups were confident that on these lines, with a contract for five years, they could handle the Bonds to the benefit of the Chinese Government. They would have a certain confidential status; they would be able to get better rates for the Government while the Groups' profit would remain the same. If the Chinese Government established an issue a point or two higher by utilising the Six Groups, which had the market, as an agency, they would build their credit up and at the end of the contract they could continue or discontinue the Groups' services as they pleased. But their credit would be good by that time. There would be no monopoly. It was merely a monopoly of the channel. If, for example, the United States were to issue Bonds in Europe they would have to go through a channel. The Groups would be the most advantageous channel for China.

With reference to supervision China declares that it is a blow at her pride. In reality supervision would be for the lasting benefit of China. She should stoop (if she so regards it) to conquer. In the French Revolution the Jews went to the Commune with financial aid and in the end the Commune succeeded, though it had to place itself in the hands of the lenders. There is much talk about the Egyptization of China. The trouble with Egypt was that indiscriminate loans had been made with various people, and eventually they could not be repaid. When the time came to collect the interest that was not forthcoming there were no Courts to which the creditors could go, and they had to appeal to their Governments and bring in diplomatic intervention. The then policy in Egypt and that which China wishes to adopt are parallel, and constitute financial suicide. Looked at from a broad viewpoint, the community of interests created by the establishment of the Six Groups would have reacted upon the six Governments' policy in welding them into a united sympathetic attitude towards China. If China breaks that common tie it will probably mean a revulsion to the conditions in 1898, when everyone was taking all that was to be got.

OTHER ASPECTS

The foregoing illustrates the views of the supporters of the Crisp Loan and those who oppose it, on the broader grounds. There are other aspects to be considered before giving attention to the actual effect of the loan on China's credit and the financial position in which China stands to-day. The supporters of the Crisp Loan claim that China has now asserted her independence of the Six Groups and that consequently her credit is better than before. The opponents of the Crisp Loan are more explicit. They point out that the price of bonds to China—89—is an extremely low one. The Hukuang Loan was fixed at 95, and was issued to the public at 100 1/2, whilst the Crisp Loan—or forty per cent. of it—went at 95, and it is declared that the 60 per cent. taken up by the underwriters was given at a half per cent. discount. There was no underwriting at all with the Hukuang Loan, which was over-subscribed tremendously, and the subscription lists closed in one and a half hours. There is reason to believe that the Six Groups, if they had got the terms they asked, could have sold the proposed bonds at par. China would have got at least 95 instead of 89.

She would, too, have established a high price for Bonds, and on the commission principle would have got the five points more on successive loans. The Crisp Loan, it is remarked, is the first Chinese issue that has not been fully subscribed. Usually the subscription list is closed in an hour and a half, with large over-subscriptions. The result of the comparative failure of the Crisp Loan will make bankers doubtful in regard to Chinese securities; they will not give so much accommodation.

The point that is most insisted upon is that China has pledged all her available, or most valuable, security as security for loans which are admitted to be only temporary stop-gaps to pay soldiers, etc. The money will soon

disappear, and in a short period China will be as badly off as before. The securities will have been parted with for a little temporary relief instead of having been used to make a permanent arrangement to utilise them for reconstruction and building up revenues to assist them in future dealings. That the Crisp Loan is inadequate, even for the immediate requirements of China, is shown by the Chinese Minister of Finance. On October 7 he sent a circular telegram to the provinces in which he stated that from the Crisp Loan the sum of $26,000,000 would be available this year. This represented the assets of the Government. The liabilities were:

Payment of Troops	$20,000,000
Payment for Cruisers	10,000,000
General Expenses (Ministry of Finance)	5,000,000
Imperial Pensions	3,200,000
Various Advances contracted by Peking and Nanking Governments	10,000,000
Indemnity	33,000,000
	$81,200,000

This shows a deficit of $55,200,000, after receiving the proceeds of the Crisp Loan, but the circular telegram states that these amounts are, if anything, underestimated, and the deficit is not expected to be less than $60,000,000, which represents liabilities maturing before December 31. The telegram makes an appeal to the provinces to come forward and pay off these liabilities for the Central Government; points out that the Provinces cannot expect any advances from the Central Government, and reminds the Provinces that the Customs revenues are all pledged.

According to an authority, not connected with the Government, liabilities of £5,000,000 will mature up to December 31, and on June 30, 1913, another £5,000,000 will be due. It is extremely doubtful whether the second moiety of the £10,000,000 of the Crisp Loan can be floated, consequently China will have liabilities of £10,000,000 to face, with but four million and a half wherewith to meet it. To be strictly accurate she may have £4,000,000, as she has already spent half a million out of this loan, and it has to be borne in mind that the cost of carrying on the Government all this time has to be met.

The Salt Gabelle

The security for the Crisp Loan was the unpledged revenue of the Salt Gabelle, and on no point does there seem to be a wider difference of opinion than in connection with its adequacy and availability as security. In the prospectus of the Crisp Loan it was stated that the Chinese Government guaranteed the unpledged surplus of the salt revenue to be Tls. 23,000,000 per year. As a fact the Boxer Indemnity calls for some £3,000,000 per year. The Customs revenue will show a surplus in favor of the Indemnity of about Tls. 10,000,000, at December 31, and the rest of the Indemnity will fall upon the salt revenue. That is to say Tls. 15,000,000 will be charged against the revenue from salt. According to the Government there is still a surplus of Tls. 23,000,000, so they anticipate the total revenue from salt to amount to Tls. 38,000,000. The cost of collection is Tls. 7,000,000 which makes the gross value of the Gabelle Tls. 45,000,000—which is in accordance with the estimate for 1911-12 that was laid before the National Council by Duke Tsai Tze, who was then Minister for Finance. As a matter of fact Duke Tsai made the total

Mr. Chou Hsüeh-hsi
PRESENT MINISTER OF FINANCE

Tls. 47,000,000. It is gravely questioned whether these figures are accurate. The estimate includes all the salt taxes, the likin, and super-taxes that have been imposed from time to time during the past ten years. The various super-taxes considerably increased the Salt Gabelle revenue. They were imposed by the various Provinces with the authority of the Central Government to assist the provinces in meeting the heavy claims upon them in connection with the indemnity services. The various Provinces were held responsible for certain portions of the Indemnity, and each Province paid a different amount.

In stating that the free surplus from the salt revenue would be Tls. 23,000,000 the framers of the prospectus of the Crisp Loan assumed that the collection would be what it was before the Revolution, and that the Central Government was in control of the revenues. As a matter of fact the collection is not the same as before the Revolution, and it is not under the control of the Central Government. Where it is now collected it is utilised by the Provinces. Mr. Chou Hsueh-hsi, the Minister of Finance, has stated that the actual contributions to the Central Government for July, August and September from the Provinces had amounted to Tls. 1,600,000, a little more than Tls. 550,000 a month—and that represented, not revenue, but subscriptions to the Patriotic Bonds. The actual receipts of the Imperial Government from the Salt Gabelle before the Revolution amounted to Tls. 20,000,000 per year, showing that the Provinces had then slowed up if the net collection was Tls. 40,000,000. The gross collection was Tls. 47,000,000, the cost of collection Tls. 7,000,000, and the amount received by the Central Government, according to the Finance Minister was Tls. 20,000,000. Now the Government is receiving nothing. The prospectus consequently can scarcely escape the reproach of being misleading. How misleading the whole proceeding has actually been will be realised by the bond-holders of the Crisp Loan when they fully appreciate the significance of the action taken by the Diplomatic Body in Peking when the Minister of Finance recently ordered the payment of the revenue of the Tientsin Salt Gabelle to the Chartered Bank for the service of the Crisp Loan. On the grounds that China may not alienate any portion of the Salt Gabelle until the Boxer Indemnity and other claims are liquidated the Italian Minister protested immediately to the Government against the action of the Minister of Finance, and in addition the Sextuple Banking Group took occasion by the hand to remind the Government that the advances it had made to the amount of some £1,800,000 were a prior claim upon the Salt Gabelle. On October 23 the Diplomatic Body appointed the Italian, French and Austrian Ministers to draw up a formal protest for presentation to the Government. This will place the Government in a quandary which its own lack of foresight has provided for it, and may likewise seriously affect the bond-holders of the Crisp Loan who have been so incautious as to flout the advice of the British Government as to the inadvisability of investing money in Chinese Bonds other than those floated on security tangible and properly controlled.

What all this resolves itself into is that the actual security for the Crisp Loan is the good faith of the Chinese Government, a security that the Chinese people have resolutely refused to accept as sufficient to warrant the employment of their money in the purchase of Chinese Government Bonds! That the Salt Gabelle could be made under proper supervision a sufficient security for a much larger sum than several times £10,000,000

is undoubted. Hsiung Hsi-ling, whilom Minister of Finance, estimated that the gross revenue could be raised to $109,000,000, with a tax of $2 per picul. He arrived at this result by estimating the population of China at 420,000,000 and assuming the consumption per head annually at 13 catties. This estimate of the population is not based upon reliable figures, but it is thought that a reorganization of the Salt Gabelle might produce a gross return of Tls. 73,000,000. Unless, however, the Gabelle were under foreign control there would be no guarantee that the extra revenue would find its way into the coffers of the Central Government. The probabilities are all the other way. The Provinces, having become accustomed to use this revenue for local purposes, are hardly likely to hand it over without protest to Peking, though the public can expect very shortly, an increase in the price of salt as a result of the efforts of the Government to overcome its financial difficulties on the lines suggested by Mr. Hsiung. It must be borne in mind that there are two small provincial loans for which the salt revenue is security, the Hupeh Silver Loan of Tls. 2,000,000 and the Liang Kiang Silver Loan of Tls. 3,000,000. There is evidence, too, that the Provinces look upon their salt revenues as their own, and it will probably take the Central Government some considerable time to convince them to the contrary. The sole authority for the statement made by the Chinese Government, and repeated in the prospectus of the Crisp Loan, that there was Tls. 23,000,000 free revenue was the Budget published last year. Even assuming that the Budget was accurate conditions have completely changed and there is no absolute certainty in regard to the amount that the Salt Gabelle will return to the Central Government. It is now charged with the service of seven loans of importance and some smaller provincial loans, and is also the security for the advances made by the Six Groups. Excluding the latter, it is estimated that the salt revenue is mortgaged to the extent of about Tls. 27,500,000, which, accepting the estimated revenue of Tls. 47,000,000 as accurate, only leaves Tls. 19,500,000 for the service of the Crisp Loan instead of Tls. 23,000,000. One possibility should not be lost sight of. The default of payments on the Indemnity by China might cause the creditor nations to take over the administration of the Salt Gabelle, in which case the claims of the bondholders of the Crisp Loan could not be admitted, since Sir John Jordan, the British Minister at Peking, has officially rejected the notification by the Waichiaopu of the conclusion of the loan on the ground that the transaction does not correspond with the declaration of the six Ministers on July 9, relative to the conditions on which they will approve loans to China.

The Effect on China's Credit

Nothing can be more certain than that China's credit has been most adversely affected by the Crisp Loan. The Bonds that are secured upon the Customs revenue and upon the North China Railways will not be affected because they are based upon securities that are admittedly gilt-edged. But this cannot be taken to indicate that China's credit has not suffered. She must soon come upon the market again. Her last tangible security has been pledged for a loan that is confessedly to be employed in staving off immediate bankruptcy. For the money that would have to be borrowed to promote industries and increase production, and thus build up the revenues, she has no security left to offer. Her requirements in this direction are enormous. Had she accepted the friendly assistance of the International Group, and consequently gained the goodwill of the six Governments, the Salt Gabelle would have been reorganized and would have become ample security for future loans. In its present state it provides doubtful fany security whatever for the stop-gap Crisp Loan, which will only postpone the evil day when China has to admit officially that she cannot meet her obligations. Only extraordinary good fortune in the shape of speedy returns from favorable crops and a willingness on the part of the populace to pay their taxes (which in some province they now refuse to do), can save her from that fate.

The issue of the loan at 89 in itself struck a heavy blow at China's credit. Had the Six Banking Groups handled the loan it would have been secured by the Government at 95 at least, and beyond question would have been snapped up by the investing public as it would have had behind it, not only the good faith and credit of China, but practically speaking the good faith and credit of the six Powers. The fact that China in her 1912 loan only received 89 and tied herself up in an agreement to that figure has been now bruited all round the financial world, and any loan that is placed in the future must be affected. The Chinese Government may think that because the Bonds secured on the Customs do not depreciate that her credit is as good as ever. A little thought should show that those Bonds are high simply because the Customs is the security and the Customs is not in China's hands, but is administered apart from them. The security is good because trade goes on, the duties are collected and the revenue banked whether there is a political crisis, a revolution, or not. If the Salt Gabelle had been in a similar condition China would never have had to accept a loan secured on its revenue at 89. It is not the Bonds secured on the Customs that denote Republican China's credit, but the 1912 Bonds which were sold by China for 89, were issued with extreme difficulty at 95, and dropped immediately to 94½, with a 1% drop by October 2, though they recovered a little. The fact that the Continental Bourses were closed to the loan foredoomed it to failure. There is no disguising the fact that to regain a fictitious "independence" China has pawned her last asset that might have been so developed that it would have helped her over the period of national reorganization, and has abated her credit. As the official estimate (which we append) for the months of October, November and December shows, her receipts are estimated at $27,195,986 and her expenditure at $70,095,688 showing a deficit of $42,899,701.

At the present moment China is trying by hook or by crook to raise more money. She is said to have closed a contract with the Belgian Syndicate for £10,000,000, ostensibly to be used for building a railway from Haichow to Lanchoufu. It is, however, rumoured that China's real intention is to obtain money for current expenses, which, if true, entirely bears out the judgment of those who warned her against contracting the Crisp Loan on the ground that it would add to China's difficulties instead of relieving them. The sum of $1,000,000 is said to have been paid to China as "bargain money," which seems to support the rumour that the loan is not really for railway construction. If China thinks that she can raise money for administrative purposes by pretending that the funds are required for railway construction, her association with the Jackson International Syndicate must have given her a poor opinion of the financial acumen of the foreigner.

To sum up. The floating of the Crisp Loan at 95, China receiving 89, has lowered China's credit certainly to 95 and probably to 90. Moreover she has parted with her last tangible productive asset and has rendered almost impossible the raising of further funds from the foreign money market. She will have in the last three months of this year £4,000,000 wherewith to meet liabilities of at least £5,000,000. She has committed herself to certain statements about the free revenue from the Salt Gabelle which are likely to prove erroneous. Moreover she has flaunted the advice of the Powers whose friendship is most likely to be valuable to her. What has she gained? "Financial independence," answer the supporters of the Crisp Loan. But has she? The Crisp Agreement, as will be seen by a glance at Article 14, in itself ties China's hands. She has only added another link to the chain. Like Egypt, China seems to have resolved upon financial suicide, and it is not a pleasant reflection for Britons that British financiers have supplied her with the means of self-destruction.

The Crisp Loan Disbursements

From the *China Republican* we take the following statement showing the

MR. LIANG SHIH-YI
ADVISER TO THE PRESIDENT

expenditure of the first instalment of £500,000 of the Crisp Loan, received through the Chartered Bank:

Interest on the Belgian Loan to be paid on Oct. 6, £6,250.

The balance of £493,750 was, after deducting loss of exchange, converted into P. Taels 3,325,816.707

Following are the disbursements from this sum, as published by the Ministry of Finance:—

Ministry of War for Sept.	Tls.800,000.00
Repayment of loan borrowed through Mr. Wong Kuk-min for the payment of troops for the month of August	„ 510,898.50
Salaries of the Military Advisory Office (arrears for February)	„ 5,000,00
Left Guard of the Wu Wei Regiment	„ 79,297.40
Imperial Bodyguard	„ 70,000.00
Peking Guards for Sept.	„ 133,397.243
Interest on loan borrowed from Po-Sheng Bank	„ 23,741.00
The Altai Army	„ 30,000.00
Bannerman Allowances for the 9th moon	„ 312,029.149
Total Peiyang	Tls. 1,964,363.292

Tsung Yi-yuan Building	$ 30,000.00
Ministry of Justice for Sept.	20,000.00
Bureau of Merits	34,000.00
Ministry of Navy	100,000.00
Interest on loan from Po-Sheng Bank	50,400.00
Imperial Pension	250,000.00
Peking Guards, arrears of payment for Aug.	69,444.44
Peking Guards, arrears of payment for Aug.	6,044.44
Ministry of Education	8,000.00
Ministry of Home Affairs	50,000.00
Tsen Tsun-hsun for Fukien	200,000.00
Nanking troops	500,000.00
Tutuh Pa Wen-wei's troops	180,000.00
General Hsu of Yangchow	150,000.00
The 8th regiment	70,000.00
The Ministry of Navy for expenses of the warships, etc.	100,000.00
The Law Bureau	5,000.00
The Government Printing Office	2,000.00
The Shanghai Arsenal	50,000.00
Ministry of Agriculture	15,000.00
Total	$1,891,688.88

This is equivalent to P. Tls. 1,362,015.994. There is a deficit balance of Tls. 562.579, which was paid out from the accounts of the Ministry of Finance.

THE ESTIMATED REVENUE OF THE CENTRAL GOVERNMENT FOR OCTOBER, NOVEMBER, AND DECEMBER

Appended are the official estimates of the Central Government for the months of October, November, and December, and the original estimates for the year 1912:

Total Revenue Receipts	$27,195,986.985
Expenditure	70,095,688.158
Deficit	42,899,701.173

	Ordinary Expenditure.	*Extraordinary Expenditure.*
Waichiaopu	$726.546.	$155,795.
Board of Interior.	1,158,994.93.	305,114.155.
„ „ Finance.	32,853,383.787.	2,695,187.7
„ „ Education.	619,250.56.	252,544.
„ „ War.	18,738,602.225.	578,985.46
„ „ Navy.	894,945.6	76,890.
„ „ Justice.	299,520.6	76,398.
„ „ Agriculture, and Forestry.	179,459.2	76,395.
„ „ Industry and Commerce.	99,797.28	35,398.44
„ „ Communication and Posts.	298,681.93	208,200.

ORIGINAL ESTIMATES.

Estimated revenue of the Central Government for 1912, based upon the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze.

I.—THE ORDINARY REVENUE.

Land Tax $47,847,070

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the total revenue for the Empire amounts to $76,545,320. It is decided from the above estimate that ten-sixteenths of the above sum shall be appropriated for the use of the Central Government, amounting to $47,847,070; that six-sixteenths amounting to $28,698,250 shall be appropriated for local expenditures.)

Salt Tax $71,292,812

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the ordinary salt revenue amounts to $71,279,902, the especial fees amount to $12,910, giving a total of $71,292,812 from the salt industry.)

Customs	$67,120,582
Likin	36,584,500
Registration Fees of Title Deeds	15,127,459
Tobacco and Wine Taxes	9,040,405

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the ordinary tobacco and wine revenue amounts to $6,288,610, but the special fees amounting to $2,751,840, have been abolished. The sum of the special fees and the ordinary revenue of tobacco and wine taxes amounts to $9,040,405.)

Mine Tax	$ 1,168,872
Stamp Taxes	93,187
Oil and Sugar Taxes	862,468
Government Properties	20,710,572
Miscellaneous Revenues	24.547,641

II.—EXTRAORDINARY REVENUE.

Land Tax .... $ 1,556,940

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the extraordinary revenue for the Empire amounts to $2,491,112. It is decided from the above estimate that ten-sixteenths, amounting to $1,506,940, shall be appropriated for the use of the Central Government; that six-sixteenths, amounting to $934,172, shall be appropriated for the local expenditures.)

Salt Tax	$ 83,326
No Customs	
No Likin	
Registration Fees of Title Deeds	46,618

Mine Tax	39,502
Opium Taxes	145,704
Special Taxes	887,718
Miscellaneous Revenue	7,201,827
Government Properties	205,474
The Total of the Ordinary Revenue	295,708,112
The Total of the Extraordinary Revenue	10,167,112
The Grand Total	$305,875,224

FOR THE LOCAL EXPENDITURES

Ordinary Revenue.

Land Tax	$28,698,250
Taxes of Pawn Shops	1,125,617
Broker's Fees	957,128
Taxes of Domestic Animals	1,387,917
Business Taxes	238,350
Miscellaneous Revenues	5,709,672
Taxes of Grains	2,911,579
Miscellaneous Fees	2,379,427

EXTRAORDINARY REVENUE

Land Taxes	$934,172
Opium Taxes	523,167
Miscellaneous fees	119,524
The Total of the Ordinary Revenue	43,407,895
The Total of the Extraordinary Revenue	1,576,863
Grand Total	$44,984,758

CHINESE GOVERNMENT 5 PER CENT. GOLD LOAN OF 1912

FULL TEXT OF AGREEMENT

We present herewith the full text of the final agreement between the Chinese Government and C. Birch Crisp and Company for the provision of a loan of £10,000,000, half of which (£5,000,000) was offered to the public in China and London on the 27th of September. The published Prospectus shows that the underwriting syndicate is composed of the following British Banks:—

The Chartered Bank of India, Australia and China, London.
Capital and Counties Bank, Limited, London.
London and Southwestern Bank, Limited, London.
Lloyd's Bank Limited, London.

Agreement made this thirtieth day of August 1912 between His Excellency Lew Yuk Lin the Chinese Minister to the Court of St. James in London duly authorized and acting for and on behalf of the Republic of China (hereinafter called the Chinese Government) of the one part and C. Birch Crisp & Company of London (hereinafter called the Financial Group) of the other part.

Whereas the Chinese Government is desirous of contracting a Gold Loan of Ten Million Pounds Sterling (£10,000,000) and

Whereas the preliminary agreement made between the Chinese Government and the Jackson International Financial Syndicate providing for the negotiation of this final agreement for the loan was duly executed on the twelfth day of July 1912 at Peking.

Whereas the said Jackson International Financial Syndicate have with the consent of the Chinese Government transferred their rights under the said preliminary agreement to the Financial Group it is agreed as follows:

ARTICLE I.

The Chinese Government authorizes the Financial Group to issue a 5 per cent. Gold Loan for an amount of Ten Million Pounds Sterling. The Loan shall be of the date on which the Bonds are issued to the public and shall be called "The Chinese Government 5 per cent Gold Loan of 1912."

ARTICLE II.

The Loan is designed to provide capital for the repayment of existing loans and for the reorganization of the Government and for productive works.

ARTICLE III.

The Loan shall constitute a direct liability and obligation of the Chinese Government which hereby pledges its good faith and credit for the punctual payment of the principal and interest of the Loan and/or the performance of all the undertakings on its part herein assumed.

ARTICLE IV.

1.—The payments of interest and the repayments of the principal of the Loan and all other amounts required for or incident to the service of the Loan shall be and hereby are constituted a first charge on the surplus revenues of the Salt Gabelle (Salt Tax) the total annual revenue of which amounts to forty-seven millions five hundred and ten thousand Kuping taels of which Twenty four millions per annum are already hypothecated. The remaining Salt Revenue now pledged to the necessary annual amount amounts to twenty-three million five hundred and ten thousand Kuping taels per annum.

2.—The above surplus revenue is hereby declared to be free from all liens charges or mortgages.

3.—Should the above mentioned revenue be at any time insufficient to meet the payments of interest and repayments of principal on due dates the Chinese Government will then from other sources supply the amount required to meet such payments.

4.—So long as the principal and interest of this loan are regularly paid there shall be no interference with the revenue herein pledged but if the principal and/or interest be in default at due date then in a reasonable period of grace the revenue above pledged or such part thereof as may be sufficient to provide and pay the amounts stated shall forthwith be transferred to and shall be administered by the Chinese Maritime Customs for the account and in the interest of the bondholders of this Loan.

5.—So long as this Loan shall remained unredeemed it shall have priority both as regards principal and interest by way of a lien or charge upon the above revenue for all future loans or mortgages which may be charged on the aforesaid revenue. No loan mortgage or other charge shall be raised or created which shall take precedence of or be on equality with this loan or which shall in any manner lessen or impair its security charged upon the aforesaid revenue and any future loan charge or mortgage charged on the said revenue shall be made subject to this loan and it shall be so expressed in every agreement for every such future loan charge or mortgage.

6.—In the event of the Chinese Government during the currency of the Loan entering upon definite arrangements for the revisions of the Customs tariff accompanied by stipulations for the decrease or abolition of likin it is hereby agreed on the one hand that such revision shall not be barred by the fact that this Loan is secured by the above named revenue and on the other hand that the revenue required to provide the security of this loan shall neither be abolished nor decreased except by previous agreement with the Financial Group and then only in so far as an equivalent security satisfactory to the Financial Group as substitute therefor in the shape of a first lien or charge upon other revenue consequent upon such revision.

ARTICLE V.

1.—The Financial Group are authorized to issue to the subscribers of the Loan Gold Bonds for the total amount of the Loan for such amounts as shall be determined by the Financial Group. The form and language of the Bonds shall be settled by the Financial Group in consultation with the Chinese Minister in London as the representative of the Chinese Government.

2.—The Bonds shall be printed and/or engraved and shall bear the fac-simile of the signature of the President or Minister of Finance and of his seal of office in order to dispense with the necessity of his signing them all in person. The Chinese Minister in London shall also previous to the issue of the Bonds put his seal upon each Bond with the fac-simile of his signature.

3.—The representative of the Financial Group in London shall countersign the Bonds as agents for the issue of the Loan.

ARTICLE VI.

1.—All details necessary for the prospectus of the Loan and connected with the payment of interest and repayment of Principal of the Loan and with the withdrawing of Bonds for redemption not herein explicitly provided for shall be left to the arrangement of the Financial Group in consultation with the Chinese Minister in London.

2.—Subject to the dates of payment for the Loan hereinafter stated the Loan may be issued in one or more instalments fixed by the Financial Group who are hereby authorized to issue the Prospectus or Prospectuses of the Loan at any time after the signature of this Agreement which is the proof that the issue and sale of the Bonds are duly authorized by and binding upon the Chinese Government and the Chinese Government will instruct the Chinese Minister in London to co-operate with the Financial Group in any matters requiring conjoint action and to sign the Prospectus or Prospectuses of the Loan and to provide any requisite documents for obtaining an official quotation of the scrip and Bonds in London and elsewhere.

ARTICLE VII.

1.—The price of the Bonds to the Chinese Government shall be 89 per cent. of their nominal value. Subscriptions may be invited by the Financial Group in China London or elsewhere preference being given to the application of the Chinese Government providing such application be made to the Financial Group not less than four days before the issue of the Prospectus to the public. Seven days' notice of the issue of the Prospectus will be given by the Financial Group to the Minister of Finance.

2.—The principal sum of Ten Million Pounds nominal shall be paid to the Chinese Government as follows:

£500,000 nominal on or before the 30th day of September 1912
£1,500,000 nominal on or before the 30th day of October 1912
£1,000,000 nominal on or before the 30th day of November 1912
£2,000,000 nominal on or before the 15th day of February 1913
and the balance of £5,000,000 nominal on or before the 30th day of September 1913.

ARTICLE VIII.

1.—The net proceeds of the Loan shall be placed to the credit of an account to be designated "The Chinese Government 1912 Gold Loan Account" in such Banks as shall from time to time be designated by the Financial Group and the sums so credited shall be held by the said Banks subject to the order of the said Minister of Finance.

2.—The Banks shall pay interest at the rate of three per cent. per annum upon the funds held by them except upon funds temporarily held by them in China where the interest shall be at the Banks' rates in Shanghai for current accounts.

3.—Orders for transfer of funds held by the said designated Banks shall be handed to the said Bank or Banks concerned not less than three days before such transfers are to be made. The expenses of transfer shall be borne by the Chinese Government.

ARTICLE IX.

1.—The rate of interest for the Loan shall be five per cent. (5 %) gold per annum on the nominal principal and shall be paid to the Bondholders half yearly as calculated from the date on which the Loan is issued to the public.

2.—The term of this Loan and of the Bonds evidencing the same shall be forty years from the date of issue of the Loan to the public. Repayment of principal shall commence with the eleventh year after the date of the Loan and shall be made by yearly amortisation in half yearly payments according to the amounts specified in the schedule to be attached to this agreement.

3.—The Minister of Finance shall twelve days before their due dates hand to the Bank or Banks designated from time to time by the Financial Group the funds sufficient to meet such half yearly payment of principal and/or interest in gold in London or elsewhere as may be required.

4.—The rate of exchange for such transactions shall be settled simultaneously with the Banks aforementioned by the Minister of Finance either at the market rate of the date on which such remittances are to be made or at the option of the said Minister of Finance on any date or dates within six months previous to any due date for the payment of interest or the repayment of the principal.

5.—In reimbursement of expenses connected with the payment of interest and the repayment of principal of this Loan the said designated Banks shall receive a commission of one-quarter of one per cent on the annual Loan service.

ARTICLE X.

If at any time after the lapse of fifteen years from the date of the Loan the Government should desire to redeem the whole outstanding amount of the Loan or any part of it not yet due for repayment in accordance with the schedule of repayment to be hereto attached it may do so up to the end of the twenty-fifth year by payment of a premium of two and a half per cent. on the face value of the Bonds (that is to say by payment of £102 10s for each £100 Bond) and after the lapse of twenty-five years without premium but in each and every case of such extra redemption the Government will give six months' previous notice in writing to the Banks and such redemption shall be effected by additional drawings of Bonds to take place on the date of an ordinary drawing as provided in the Prospectus of the Loan.

ARTICLE XI.

In the event of any Bond or Bonds issued for this Loan being lost stolen or destroyed the Financial Group and/or the said designated Bank or Banks concerned may notify the said Minister of Finance and/or the Chinese Minister in the country wherein the said Bond or Bonds may have been lost as the case may be who shall authorise the Financial Group and/or the said designated Bank or Banks concerned to insert an advertisement in the public newspapers stating that payment of such Bond or Bonds has been stopped and to take such other steps as may appear advisable or necessary according to the law or customs of the country concerned. Should any Bond or Bonds be destroyed or should such lost or stolen Bond or Bonds not be recovered in a lapse of time to be fixed by the said designated Bank or Banks the said Chinese Minister in London shall seal and execute a duplicate Bond or duplicate Bonds for a like amount and deliver the same to the Financial Group and/or the said designated Bank or Banks representing the owner or owners of such lost stolen or destroyed Bond or Bonds which Group and/or the said designated Bank or Banks shall pay all expenses in connection with such delivery and execution of such duplicate Bond or Bonds for the account of the owner or owners of such Bond or Bonds.

ARTICLE XII.

All Bonds and coupons and payments made and received in connection with the service of this Loan shall be exempt from all Chinese taxes and imposts of any and every description during the currency of this Loan.

ARTICLE XIII.

All expenses of the Financial Group in connection with the flotation and issue of this Loan such as underwriting commission and brokerage telegraph charges advertising postage engraving and printing of Prospectus and Bonds stamp and legal fees shall be borne by the Financial Group.

ARTICLE XIV.

The Chinese Government engage not to issue nor to authorise the issue of any other external loan until the whole of this Loan 1912 has been issued to the public on any more favorable terms than those contained in this agreement but if the Chinese Government should desire to obtain further foreign capital before this Loan is realised and the terms offered by the Financial Group are as favorable as those offered by others preference shall be given to the Financial Group.

ARTICLE XV.

If before the publication of the Prospectus for the issue of this Loan any political or financial crisis should occur affecting the money markets and the prices of Chinese Government securities in such manner or to such degree as in the opinion of the Financial Group will render impossible the successful flotation and issue of this Loan on the terms herein named the Financial Group shall be granted a period of six months from the date on which this agreement shall be signed within which to issue the Loan to the public. If on the expiration of this period the markets are still unfavorable then the Financial Group shall be entitled to ask the Chinese Government for reasonable extension of time within which to carry out this contract. If the Chinese Government should refuse to grant the extension of time requested this contract shall become null and void.

ARTICLE XVI.

The Financial Group may subject to all their obligations under this agreement transfer or delegate all or any of their rights powers and discretions thereunder to any British or other Company Directors or Agents with power of further transfer and sub-delegation such transfer sub-transfer delegation or sub-delegation to be subject to the approval of the Chinese Government.

ARTICLE XVII.

This Agreement is signed by the Chinese Minister in London as the representative of the Chinese Government and will be forthwith officially communicated to the Minister of Great Britain in Peking by the Wai Chiao-pu (Chinese Foreign Office) and by the Chinese Minister in London to the British Secretary of State for Foreign Affairs and a copy of each such formal notification and any reply thereto shall be communicated to the Financial Group.

Signed at London this the thirtieth day of August one thousand nine hundred and twelve.

(SIGNED) LEW YUK-LIN
G. BIRCH CRISP & CO.

WITNESSES:

J. MACLEAVY BROWN.
ERNEST RONEY.

A CAMPAIGN OF CALUMNY

The campaign of villification indulged in by the original promoters of the Crisp Loan to influence public opinion in China against the Foreign Governments and the Sextuple Group of Bankers reached a climax when their organ, the "National Review" of Shanghai, in a leading editorial appearing in its issue of September 14th, wilfully insulted the American Minister at Peking, characterizing the eminent and respected international jurist as a financial lawyer solely devoted to the interests of a powerful financial house. An unwarranted and undignified attack of this nature on a diplomat enjoying the high reputation of Mr. Calhoun is beneath the notice of honourable journalism, but when it is known that the newspaper publishing the libel enjoys the confidence and support of the Chinese Government, and that the owners of the "National Review" were interested in the promotion of the Crisp Loan and stood to gain through its successful flotation, its campaign of defamation against those supporting the Sextuple Group is an unpardonable offence against the ethics of journalism and good manners.

Perusal of British newspapers of the dates corresponding with the issuance of the Crisp Loan on the London market, also reveal a most astounding campaign of press misrepresentation, and appeals to national antipathies unparalleled in the history of yellow journalism since the days preceding the Spanish-American war in 1898. The entire campaign reeked with abuse of the British Government and the British Corporation that had successfully carried the brunt of the financial battles of the last two decades for the advancement of British prestige and trade in China.

The fact that the directorate of the Hongkong and Shanghai Banking Corporation included the names of four German gentlemen, heads of the largest German commercial firms in Hongkong and China, was used as the lever to work the British public into a frenzy of patriotic indignation against the policy of the Foreign Office in standing by its word of honour given to five other Governments. The German bogey was conjured up before the eyes of an overwrought public, and when the loan went on the market it was successfully absorbed on purely national grounds.

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Newspaper invective and misrepresentation directed against the British Government and the Six Power Group, by which the British public was blinded to the true facts of the position was solely responsible for what is jubilantly termed a triumph of British financial genius, and a victorious restoration of British prestige in China.

The original promoters of the Crisp Loan are the Jackson International Financial Syndicate, closely allied with a concern known as the China Conservation and Development Company, Limited, organized under the Companies Ordinances of Hongkong for the purpose of making loans and obtaining mining and other concessions. It is a curious coincidence that the names of the original incorporators of the above company coincide with the names of the part owner, managing editor, editor artist, translator, advertising solicitor, and a member of the family of the managing editor, or in other words, with the entire staff, of the "National Review," a part-Chinese-owned and British edited weekly newspaper published in Shanghai. In addition to the above list of incorporators appears the name of an American who with the part owner and managing editor of the "National Review" comprise the directorate of the concern. It is quite apparent that the China Conservation and Development Company is therefore under the control of the owner or owners of the "National Review," and the staff of the paper was taken in primarily to secure the necessary number of names for registration purposes. This reduces the company to the owners of the "National Review," one of whom is a high official of the Chinese Government intimately associated with the President and his advisers, and the other the British Managing Editor. Or, again, it narrows down to the man with the influence, the close friend and confidant of those high in office at Peking; or a last analysis would reveal that the China Conservation and Development Company, Limited, was simply a Chinese controlled concern in which enough foreign names had been admitted to disguise the real Chinese character of the organization.

From the fact that a high Chinese official is the central figure in a foreign corporation whose avowed purpose is to make loans to and obtain concessions from the Chinese Government and that this official was in Peking when the preliminaries of the loan were being negotiated, it is logical to deduce that it was through his undoubted influence that the preliminary contract for the £10,000,000 loan at 89 was secured for his associates.

It is claimed by the Sextuple Group that they stood ready to underwrite Chinese bonds at 95 on the security of the unattached surplus of the Salt Gabelle. But we find that China in her very natural desire to escape the conditions imposed by the Sextuple Group as to the auditing of expenditures and control of the Salt Tax entered into a contract with a Chinese controlled promotion company to give the Salt Gabelle revenues as security for a loan to be issued to the promoters at 89. The Chinese Government emphatically assured its Minister at London by cable, for the express benefit of the British public, that the unattached portion of the Salt Gabelle was more than ample for the service of the present loan, and in fact there would still be a surplus available for the security of future loans. The question naturally arises: If China was absolutely certain as to the amount of the surplus, why was she so anxious to sacrifice her credit and permit the loan to go to the promoters at 89 and to the public at 95, when she could have secured 95 from the Sextuple Group with a possible flotation to the public at par? Surely, if the unattached surplus of the Salt Gabelle is what China officially declares it to be, the negotiation of a loan at 89 on such excellent security must be viewed as the price China was willing to pay to escape the conditions of the Sextuple Group, or would indicate that the Chinese controlled promotion company was unduly favored by terms which the Chinese Government would never have granted to any other combination. The issuance of the Loan at this low figure, on such good security, would also explain the willingness of the British underwriters to undertake the business in defiance of the expressed wishes of the British Government. It would furthermore explain why the original promoters in China disregarded all the ethics of journalism and the instincts of patriotism in their vindictive campaign against the British Government and the Groups through the medium of their organ, the "National Review," published at Shanghai. The publicity campaign carried on by this newspaper against those opposing the Crisp Loan is the most prominent and questionable feature of what otherwise might be considered a legitimate effort on the part of the promoters to advance the interests of China and insure the success of the loan. Commercial journalism was probably never before so brazenly flaunted before the public.

In its zeal to line the pockets of the original promoters with their share of the promotion profits, the Editors so far forgot the allegiance and loyalty due their own country as to forge the weapons which the Chinese might employ in a boycott against British trade in China. The great fair-minded

British public, hypnotized by an appeal to their patriotism by the promoters at the London end, rose to the bait, and under the delusion that the loan would strengthen and restore British prestige in China took up forty per cent of the issue, while at this end the original Sino-British promoters of the loan were goading the Chinese into a frenzy of anti-British feeling through the medium of the "National Review" and nullifying the work of the London promoters. It is a sorry picture for Britons to contemplate.

China has, yet to learn that a newspaper campaign improperly directed may prove a curse rather than a blessing, and that "most modern wars may be ultimately traced to national antipathies which have been largely created by newspaper invectives and by the gross partiality of newspaper representations." China's side of the loan situation could have been set forth in a dignified and telling manner by proper publicists and obtained for her much needed sympathy and support.

With all the opportunities of the last year of charging officials with corruption, the foreign press has carefully avoided intentionally wounding the feelings or susceptibilities of Chinese officials, who, in other countries, would have been "muck raked" into political oblivion. If China is satisfied with the terms of the Crisp Loan at 89 when she could have secured 95 it is her own concern, and her friends can only hope that the sum so borrowed will be sufficient to tide her over until her internal revenues are reorganized and sufficient funds are available from the provinces to carry on the government without further recourse to a foreign loan for admistrative purposes. The only regret is that she should have employed a medium which has misused its power to create and foster ill-feeling on all sides.

The insult to the American Minister, coming from a paper claiming to receive the support of the Chinese Government, together with the rabid anti-British attacks, and the vindictive campaign against the Groups and those opposed to the loan, can only have one effect; and when the sober solid sense of the British public at home has again reasserted itself and it discovers how its well meant support has been negatived by the work of a group in China whose pockets were its first concern, a reaction will set in which is bound to have a serious effect on China's credit.

If the "National Review" has ceased to receive the support of the Chinese Foreign Office, an intimation to that effect from Mr. M. T. Liang, the Minister for Foreign Affairs, would only be a delicate and courteous action due to Mr. Calhoun and American residents in China, otherwise American opinion will associate the slur to its Minister as emanating from a semi-official organ of the Ministry of Foreign Affairs.

U. S. R'Y RECEIPTS & EXPENSES

As the month of July began a new fiscal year for American railways and also from all indications a period of reviving traffic, it is probable that the railway returns will be closely watched, especially during the months of the presidential campaign. But the uninitiated reader who tries from the newspaper reports of earnings and expenses to keep track of the business of the railways has a perplexing task, for in one and the same issue of a newspaper he not infrequently finds statements of earnings and expenses that may refer to different periods separated by weeks or months, or maybe a year or more.

The accounting departments of many of the principal railroad companies make up at the close of each week estimates of the receipts for that week and sometimes include estimates of the expenses. These are primarily for the information of the officers and directors of the companies, but are frequently sent to the newspapers. Thus appear estimates and cumulative estimates for the first, second, third and fourth weeks of each month and for the entire month. These are but estimates in gross, and as such serve as the earliest approximate indications of increase or decrease in the volume of traffic. They are widely regarded by business men as a barometer of the general business of the country. From these estimates various financial newspapers frequently compile tables showing approximately the earnings and expenses of a number of roads selected as representative.

As soon after the close of each month as practicable each railway company is obliged to send to the Interstate Commerce Commission a report of its total operating revenues during that month with separate specification of the receipts from freight, passengers, mail and express; of its total operating expenses with separate specification of those incurred for maintenance of way and structures, maintenance of track and equipment, for securing traffic, conducting tr nsportation and in general; of the nett operating revenue; of revenue from outside operations; of taxes; and of operating income which is the amount remaining as available for rentals, interest on bonds, appropriations for betterments, and dividends.

The filing of these monthly reports with the Interstate Commerce Commission is usually not completed until about six weeks after the close of the month to which they refer. From these official reports the Bureau of Railway Economics, an organization maintained in Washington by the railways, compiles a summary of revenues and expenses for the month which is usually issued within a week after all of the reports have been filed. Most of the newspaper publications of earnings and expenses give the amounts for the different railways separately, the information thus presented being of especial interest to the investor who wants to know what each road is doing. The compilations of the Bureau of Railway Economics, however, are of the collective earnings and expenses of the Eastern, Southern and Western groups of railways, thus showing the ebb and flow of traffic for the three great sections of the country, each of which has its peculiar economic characteristics. These publications also contain comparisons of the earnings and expenses per mile of line, thus showing the actual trend of railway business, the indication of which is often confused in other compilations by the use of aggregates applying to the total mileage, which is continually increasing to a greater or less extent. The earnings and expenses are thus also reduced to concrete and comprehensible units of measurement.

For example, in its summary of earnings and expenses for June 1912, the Bureau of Railway Economics shows that the nett revenue for the month increased about 48 cents for each day for each mile of line over the nett revenue of June 1911. It shows that during the fiscal year ending June 30, 1912, total operating revenues increased $83 per mile of line, leaving a decrease in nett revenue of $60 per mile of line. An incr ase of $48 in taxes and a decrease in nett revenue from outside operations resulted in a decrease in operating income of $112 per mile of line for the year. This is equivalent to a decrease in the operating income of the 215,000 miles of line to which these reports have applied on the average, of over $24,000,000.

The monthly report of the Interstate Commerce Commission issued usually about a month later than the summary of the Bureau of Railway Economics presents an abstract, company by company, of the monthly reports filed with it.

As soon after the close of the fiscal year as is practicable, and under penalty not later than September 30th, each railway company is required to make to the Interstate Commerce Commission an elaborate report of its transactions for the year. This includes a statement in great detail of receipts and expenditures, of mileage, of locomotives and cars, of the number of employees and their compensation, of the capitalization and capital issues, of statistics as to train miles, car miles, freight traffic movement, ton miles, passenger miles, taxes, and of profit and loss.

The statistics contained in these reports are of such great volume that their compilation requires several months, the annual report of statistics of the railways of the United States issued by the Interstate Commerce Commission not appearing as a rule until a year or more after the close of the year to which the statistics refer. It is a most valuable compendium placing before the student of railway transportation the most complete available information. The system of accounts prescribed for the railways by the Interstate Commerce Commission and the publicity in regard to their affairs which it has enforced have placed

the railways in that position where far more is made public about their affairs than is known in regard to any other industry of the United States, or any of the state or municipal governments.

In addition to all the reports that have been enumerated each railway company makes an annual report to its stockholders to which many newspapers give more or less extended reference, and many if not all of the State Railroad Commissions require separate reports.

THE BUREAU OF RAILWAY ECONOMICS

In an address before the American Economic Association during the meeting of that body in Washington in December last President Taft congratulated the professional economists upon the increasing extent to which their services were being called into requisition by the Government for the investigation and analysis of intricate questions of public concern. He might have added that it is not alone the Government which has "turned the corner," as he expressed it, in calling for such expert service. A forward step in the same direction was taken by railway companies of the United States in establishing the Bureau of Railway Economics.

The need for such a bureau was first felt during the period of discussion which preceded the enactment of the Federal railway legislation of 1906 and 1910. Sometimes it happened that different analyses of serious matters were based upon varying *data* and led to inharmonious conclusions. Moreover, the railways were not always in the possession of the complete information necessary to enable them to refute widespread accusations that they knew to be unjust. Railway officers absorbed in the problems of immediate administration were without the time and the opportunity to study the broader questions of no less, and sometimes of greater, importance.

Its Origin.

In the spring of 1910 there was held a meeting of railroad presidents to discuss methods for bringing fulness of knowledge into their discussions of the broad questions of general concern, accuracy to their conclusions, and that force to their presentations which accuracy alone can give. It was recognized that to this end there must be a competent agency whose time and attention should be given entirely to the study of the more intricate subjects of general interest. It was recognized that the ultimate solution of the problems affecting the railways must be upon the basis of exact fact; therefore, that the exact facts underlying every question must be carefully ascertained and logically presented. At that meeting was appointed a general executive committee of six railroad presidents who established the Bureau of Railway Economics. The processes tending toward uniformity and standardization (referred to in other articles) which developed the American Railway Association charged with the study of matters pertaining to the physical and technical phases of railway operation, and which also developed the various associations of traffic, accounting and financial officers charged with the unification of procedure pertaining to their respective departments, thus led to the formation of an organization charged with the study of the relations of the railways to their environment—their economic relations.

A Source of Accurate Information.

The headquarters of the Bureau of Railway Economics were established in Washington that it might be facilitated in its scientific study of railway problems by ready access to the statistics and records of the Interstate Commerce Commission and of other departments and bureaux of the Federal Government. That its main function as a source of accurate and authentic information be not impaired, it was forbidden to engage in polemic and partisan discussion.

In furtherance of its purpose to become a recognized source of accurate and authentic information in regard to the railways the Bureau is building up a comprehensive library and has issued a catalogue of the existing body of railway economic literature. It works in harmony with, and sometimes in at least partial collaboration with, the Interstate Commerce Commission. The main point of distinction between the statistical departments of the two organizations is that while the compilations of the Interstate Commerce Commission principally serve the purposes of record and reference, those of the Bureau are designed to throw light upon various phases of the existing situation for the current information and guidance of its constituents.

Important Inquiries.

The Bureau makes special investigations, analyses, and compilations in response to specific requests of its subscribers. It publishes a monthly summary showing the collective trend of railway earnings and expenses, and from time to time it publishes the results of studies of general interest. Such, for example, is a comparison of the railway *status* of the United States with that of the principal countries of Europe. It has issued a bulletin comparing the facilities, serviceability, and utilization of the railways of the United States, the United Kingdom, France, and Germany; another comparing the railway wages and cost of living in these countries; and by the time this article appears has probably issued a further bulletin making a specific comparison of the freight rates in these countries. These general publications of the Bureau are sent not only to railway officers, but to the educational institutions throughout the United States, in which they are being used in increasing degree by teachers of economics, and to the railroad commissioners, by whom they are in constant demand. While the Bureau is not a publicity agency, the results of these studies are also made available to the newspaper Press for the information of the public in general.

From the London Times of June 28, 1912— "The American Railway Number."

BOOK REVIEW

History of Bridge Engineering

By Henry Grattan Tyrrell, Evanston, Ill.

The book is six by nine inchs in size, and contains 505 pages with 330 illustrations, a few of which are half tones. It is bound in cloth, sells for $4.00 per copy, and may be had at any book store.

It is written in semi-popular style, and while interesting chiefly to Engineers and Architects, will be appreciated also by others who care to follow the development of Architecture and Engineering through the centuries. It is divided into seventeen chapters, and covers the history of bridge building from the earliest times to the present day.

The first chapter is devoted to early Egyptian, Babylonian and Persian bridges dating back to 4000 B.C. and one bridge is described which is said to have been placed across the Euphrates river at Babylon 3200 B.C. The second chapter includes Roman bridges, covering the period from 700 B.C. to 400 A.D. and describes not only all the ancient bridges over the Tiber at Rome, but many others throughout the Empire, including some which are still standing and in use. Following this are two chapters on Mediæval and Renaissance bridges, which describe all the principal ones erected to the middle of the eighteenth century. In all of these early chapters, are illustrations of many bridges with features which are no longer needed, such as shrines and fortification towers, some of the designs being extremely picturesque. In many cases their towers and porticoes show a high degree of artistic design, and those at Avignon, Cahors, Florence and Prague have hardly been surpassed.

In addition to those for carrying roads and highways, the writer has included pontoon and aqueduct bridges, some of the latter which still remain dating back to the beginning of the Christian Era, such as the noted Pont du Gard at Nimes, France, which was built by the Romans during the reign of Emperor Augustus about 19 B.C.

The chapter on Modern Stone Bridges covers the period from 1750 to the present time and includes most of the notable ones of Europe which are now in use. These seven chapters including 120 pages, cover the history of bridges in stone.

Following these chapters are others on wood and cast iron arches, simple trusses, tubular and plate girder bridges, suspensions, cantilevers, metal arches, trestles, and last of al two chapters on concrete bridges, both plain and reinforced.

An interesting part of the book is that which describes the last quarter of the eighteenth century, when the first iron bridges appeared in England. For half a century the cast iron arch was used almost exclusively, and many beautiful examples appeared throughout the British Isles, the work of such men as Thomas Telford, and John Rennie. After the advent of railroads, bridge building assumed a new importance and structures were then made strong enough to carry heavy trains and locomotives, some of the most interesting ones being the work of George Stephenson who was Chief Engineer of one of the large railroad systems. The Britannia bridge in Wales and the old Victoria bridge at Montreal are the work of this eminent engineer and his son Robert Stephenson. The Author describes the elaborate experiments made by the Stephensons before starting work on their tubular bridges, and gives an account of their construction and completion, works which were then considered the triumphs and wonders of the age.

As cast iron arches were at first patterned after those in stone, so also were the first trusses in iron fasteined after the early ones in timber. Numerous illustrations are given showing the development of trusses from their first scientific beginning in 1847 to the present time.

The evolution of suspension bridges is then traced from the early ones of vines and twisted creepers, made by the Indians in Peru, and those in China, Japan, and India, to the completion of the great ones at Budapest, London and New York.

Cantilever bridges, which by some are considered new, are shown to have existed fifteen hundred years ago, though they were used only in very crude forms previous to the nineteenth century, when a span was projected to cross the Hudson River. Following this are accounts of all the great cantilevers, concluding with the completion of the Queensboro bridge at New York. This chapter contains many notable examples, including one which was proposed to cross the English Channel, and the great Quebec bridge now under construction.

The development of metal arch construction is traced from its beginning in 1776 down to the introduction of steel in the great spans crossing the Mississippi at St. Louis. Many illustrations are shown including several designs of unusual merit by American Engineers and Architects, which have not yet been executed. Many designs are described and illustrated including some of the beautiful ones over the Seine and the Rhine, and the long spans of 1,000 and 1,800 feet proposed for New York and Quebec.

Trestles, which were among the earliest known types, dating back to the days of Babylon, are described, and a number of modern types shown in both timber and metal. Some picturesque examples are illustrated including the old Portage viaduct and some of the very long ones, such as that crossing Great Salt Lake, Utah. George Stephenson's first metal trestle at West Auckland is shown, and also many others in Europe and America.

The last two chapters including fifty pages, describe concrete bridges, and show their rapid rise and use from their beginning in France about 1850.

The book is well printed on heavy paper, and should be valuable not only to students and lovers of history, but to engineers and designers, who will find in it many types and forms useful in the present day.

THE BRITISH ENGINEERS' ASSOCIATION

SOME ABRIDGED EXTRACTS FROM THE PARTICULARS ISSUED BY THIS IMPORTANT ASSOCIATION, WHOSE OBJECT IS THE PROMOTION OF BRITISH ENGINEERING INTERESTS IN CHINA

The formation of this association is evidence of an awakening to the enormous value of Far Eastern trade from the point of view of manufacturing engineers. That recognization has dawned slowly. We are confident that organized interest in the engineering possibilities of this part of the globe—as long as the ideal of Equal Opportunity and the Open Door is in view—cannot fail to have a general beneficial influence.

Readers of the FAR EASTERN REVIEW know that we have found it necessary to criticize the policy adopted in many instances in connection with railway construction in China of drawing up specifications for tenders in such a form that bids were necessarily restricted to favoured manufacturers of the nation represented by the engineer. Obviously if there is to be equal opportunity in China in this regard the standards of any particular country must not be adopted to the exclusion of others. The new Association will, no doubt recognise that fair play in this connection will be to the general advantage of the manufacturers of all countries. With the imminent enormous extension of railway construction in China it would be eminently desirable, as we have suggested before, that a temporary commission consisting of expert railway engineers, composed of one British, one American, one European and two of China's best railway men, should be appointed to draw up a Standard set of specifications for the rolling stock and equipment of the Chinese Government lines. Otherwise the system of discrimination will be continued and equal opportunity will disappear in connection with railway construction and equipment in China.

[Editor F. E. R.]

THE ORIGIN OF THE ASSOCIATION.

The British Engineers' Association is an organisation formed for promoting and protecting the interests of British manufacturing engineers abroad, and especially in China. To that country its immediate attention will be exclusively devoted.

After several preliminary meetings and discussions, twenty-two leading British engineering firms in September last decided to take the initiative in organising the Association. These firms found the funds necessary for the preliminary expenses, and from among their directors was formed a powerful Provisional Committee to carry on the work of the Association until its incorporation.

In the meantime a number of other well-known firms were elected, bringing the total number of members of the Association prior to incorporation up to sixty-one.

THE FIRST MEMBERS OF THE BRITISH ENGINEERS' ASSOCIATION.

W. H. Allen, Son and Co., Limited.
Avonside Engine Co., Limited.
Babcock and Wilcox, Limited.
British Aluminium Co., Limited.
British Insulated and Helsby Cables, Limited.
Peter Brotherhood, Limited.
Brown, Bayley's Steel Works, Limited.
Brush Electrical Engineering Co., Limited.
Callender's Cable and Construction Co., Limited.
Campbell Gas Engine Co., Limited.
Chloride Electrical Storage Co., Limited.
T. Cooke and Sons, Limited.
Craven Brothers, Limited.
Crossley Brothers, Limited.
Dick, Kerr and Co., Limited.
Fielding and Platt, Limited.
George Fletcher and Co., Limited.
Fraser and Chalmers, Limited.
Richard Garrett and Sons, Limited.
Glenfield and Kennedy, Limited.
W. T. Glover and Co., Limited.
E. Green and Son, Limited.
Hadfield's Steel Foundry Co., Limited.
J. and E. Hall, Limited.
Hardy Patent Pick Co., Limited.
Hayward-Tyler and Co., Limited.
Heenan and Froude, Limited.
Alfred Herbert, Limited.
Holden and Brooke, Limited.
Holman Brothers, Limited.
John Holroyd and Co., Limited.
Hughes and Lancaster, Limited.
Richard Johnston and Nephew, Limited.
H. R. Marsden, Limited.
Marshall, Sons and Co., Limited.
Mather and Platt, Limited.
Midland Railway Carriage and Wagon Co., Limited.
Miller and Co., Limited.
McKie and Baxter.
North British Locomotive Co., Limited.
Platt Brothers and Co., Limited.
Power Gas Corporation, Limited.
A. Ransome and Co., Limited.
Ransomes and Rapier, Limited.
Ransomes, Sims and Jefferies, Limited.
Robey and Co., Limited.
Rose, Downs and Thompson, Limited.
Royce, Limited.
Ruston, Proctor and Co., Limited.
Sandycroft Foundry Co., Limited.
Smith's Dock Co., Limited.
Stewarts and Lloyds, Limited.
Stothert and Pitt, Limited.
John I. Thornycroft and Co., Limited.
E. R. and F. Turner, Limited.
Vickers, Limited.
Vulcan Foundry, Limited.
Walker Brothers (Wigan), Limited.
J. Samuel White and Co., Limited.
Willans and Robinson, Limited.
Edward Wood and Co., Limited.

The Association was formally incorporated on April 26, 1912, under a licence from the Board of Trade. Consequently the liability of its members is strictly limited.

The objects for which the Association is established are:—

(1) To promote and protect the general interests of British manufacturing engineers.

(2) To consider all questions connected with such interests.

(3) To promote or oppose legislation and other measures affecting such interests.

(4) To collect and circulate statistics and other information affecting the general interests of British engineers and to diffuse amongst its members information on all matters affecting such interests.

(5) To support the British Government, bankers, financial corporations, shipping and railway companies, and any other organisations in promoting the general interests of British manufacturing engineers.

(6) To watch and report upon the methods and progress of foreign competitors in Asiatic and other markets and to suggest methods of counteracting foreign influences.

(7) To encourage the predominance of British technical instructors in Asiatic and other schools.

(8) To encourage technical colleges and schools in Great Britain to give facilities for Oriental and other students, and to establish or aid in the establishment of technical schools abroad for the furtherance of the objects of this Association.

(9) To aid by advice, co-operation, donations or otherwise any individual or concern who is able to promote the the objects of this Association.

(10) To invite members of the Association to give facilities for the introduction into their works for varying periods of Oriental and other engineers or engineering students.

(11) To endeavour to make the English language the recognised medium for the transaction of all engineering business.

THE CONSTITUTION OF THE ASSOCIATION.

The Articles of Association provide that this Association shall be governed by a Council consisting of a President, five Vice-Presidents, and not less than fifteen or more than thirty ordinary members of Council, elected annually from all the members of the Association.

The Council will elect from among its own members an Executive Committee for carrying on the active business of the Association.

A Commissioner or official representative of the Association, with such staff as he may require, will be located in China, and will carry on the business of the Association in that country, investigating actively all matters which are of interest to members of the Association, and forwarding at the earliest possible date such information to the office of the Association in London to be dealt with by the Council or Executive Committee and disseminated to all members.

The Commissioner in China will not communicate direct with any individual member, but individual members can apply for his advice on all specific matters through the London office.

In event of a member of the Association travelling in China he will be entitled to apply for advice and introductions to the Commissioner of the Association provided that he has notified the office in London of his intention to visit China and has obtained the necessary credentials.

It will be no part of the business of the Commissioner to endeavour to secure orders for any individual member, to discriminate between its members, or to favour one in preference to another.

The funds of the Association are derived from the subscriptions of members and entrance fees.

The whole of the income of the Association will be applied solely towards the promotion of the objects of the Association as set forth in the Memorandum and Articles.

THE QUALIFICATIONS FOR MEMBERSHIP.

Article 4 provides the following qualifications for membership:—

"Candidates for admission as members must be approved by the Council and must be bona-fide British manufacturing engineers or bona-fide British manufacturers of articles accessory to engineering plant other than those whose

interests in foreign manufactures or otherwise might be antagonistic to the objects of the Association, and must be individuals or incorporated bodies. Any unincorporated body or firm falling within the above definition, if approved by the Council, may have the privilege of membership, meaning thereby the right to nominate anyone of its members to be a member of the Association as its representative. All corporate bodies must be represented by either a director or other responsible official properly accredited and not under twenty-one years of age. Such representative shall while thus accredited be entitled to all the rights and privileges belonging to membership. Any member ceasing to hold the necessary qualifications as defined above shall *ipso facto* cease to be a member of the Association and shall forfeit all rights of membership."

The fact of a firm possessing engineering or other works or being interested in such works in Great Britain does not *in itself* qualify that firm for membership, nor does the possession of engineering or other works outside Great Britain necessarily disqualify such firm from membership.

The essential point which will determine the qualification is whether in the opinion of the Council the applicant for membership has or has not foreign interests or connections which are detrimental to the interests of the Association.

The Value of China as a Market.

For some years, in spite of the powerful reactionary influences which existed in China until the revolution of last year, the progress in that country, and consequently the demand for engineering plant, has been growing with extreme rapidity.

Without going into details, it is well to state the fact that while Japan, usually cited as the most rapidly progressive country in the world, took thirty years to build 3,000 miles of railway, China has during the last twelve years built no less than 5,000 miles.

Naturally Chinese imports all round have increased very rapidly. During 1910, which was the last complete year of China under the old régime, they stood at £62,300,000, a rise of more than £12,000,000 over the previous year, and £15,000,000 more than Japan's imports for the same period, though in Japan, too, 1910 was a record.

Chinese engineering imports during 1910—that is to say, goods which would fall within the range of firms who are eligible for membership of this Association—were about £8,000,000. Of this total the British share may be put approximately at rather over 40 per cent.

China, however, is merely at the beginning of her career as an importer of machinery. With ten times the population of Japan, and perhaps a hundred times the natural resources of that country, and possessing a people in whom the business instinct is ingrained, there is no doubt that under the new régime, whatever form that may take, machinery requirements will undoubtedly expand, for the Chinese will be able for the first time to give free vent to their progressive tendencies. From this it is reasonable to suppose that China will become one of the greatest oversea markets for engineering plant.

A Comparison Between China and Japan.

China to-day, so far as her knowledge of engineering is concerned, is very much in the condition of Japan some thirty-five years ago, but the position of the British engineer in China is by no means as strong as it was in Japan at that period.

In dealing with Japan in the early days British engineers had an immense advantage over all their competitors. This was due to two causes: (1) Japan selected and paid for her own advisers and instructors and financed her own industrial enterprises. (2) She selected, as far as engineering was concerned, British advisers and instructors in nearly every case.

Thus the early Japanese engineers were not only thoroughly imbued with a predilection for British plant, but their engineering education was all absorbed on British lines. The intimacy between the Japanese student and the British professor not only accentuated that leaning towards British products in the early days, but its influence has continued even to this day, though the Japanese now consider that they are no longer in need of European advice.

In China matters are on quite a different footing: There are some eight nationalities vying with each other in lending money to China for industrial enterprises, and clamouring for industrial concessions. Out of these countries Great Britain is the only one who does not couple with her financial assistance some stipulation as to a *quid pro quo* from China. The other nations habitually stipulate that the money shall be spent largely on plant from the country in question, or that engineers of that nationality shall be employed in connection with the undertaking for which the money is found. China is forced to take her advisers from the countries who lend her money, and the result is that British influence is being ousted.

The Diplomatic and Consular Conditions.

The foreign diplomatic and consular services in China in every case, with the exception of the British, are leaving no stone unturned to force the trade into their own respective countries. The British Government are apathetic on this subject. It is true that of late years they have gone to some trouble to issue reports more systematically and of a better quality than in times gone by, but their organisation for collecting information, though expensive, is still less effective than that of other Powers. Thus Britain's foreign competitors are better informed.

German and American Influence on Education.

Britain's two strongest competitors, Germany and the United States, are making a very serious bid for the education of the Chinese engineer. The Germans, with their model dockyard at Tsingtao, have properly organised engineering works where young Chinese of the right class are encouraged to attend and learn thoroughly, not only the German language, but engineering and dockyard practice, and large sums of money are expended in bringing to Germany the right class of Chinese for their engineering training.

Then, again, German manufacturing engineers on their own account have an association for dealing with their overseas interests, and have subscribed a large sum for the purpose of creating three purely German engineering schools in China. These schools are to be effective nurseries for the German machinery trade. German diplomacy, too, has succeeded in introducing the German professorial element very largely into Chinese native schools.

The Americans have gone a step farther. The waived a portion of their war indemnity against China after the Boxer rebellion on the understanding that that money should be spent in sending over the right class of Chinese to the United States for the purpose of theoretical and practical education.

Both the United States and Germany have their own journals catering for Chinese requirements, and in them engineering and industrial matters generally are preponderating. One of these German journals has an English title, and is printed throughout in English.

Thus on the one hand the Germans are spending large sums of money to create and foster a knowledge of the German language by their technical schools, and on the other are utilising the English language to secure trade pending the realisation of their scholastic ideals.

The Banking Facilities of Other Nations.

The German, the American, the French and the Belgian banks are all strengthening the hands of their respective manufacturers in every way. They give facilities for financing large contracts which are unobtainable by British firms from their own bankers, and which constantly tell against British chances of business. One of the most serious results of this policy is that often by the time the British manufacturer hears that an order is to be placed and is offered an opportunity to tender, the whole matter is cut and dried and the fact that the contract is to be placed with one or another of the foreign firms is a foregone conclusion.

Another influence which very often tells against British interests in China is the attitude of certain merchants who, while professing to represent British firms and to study British interests, are subject to all sorts of international influences which make it impossible for them to regard matters from the same point of view as the British manufacturer.

The Collective Influence of British Engineers.

It is to overcome all these obstacles to the legitimate progress of our trade that the British Engineers' Association has been formed, and the lever to be used is the collective influence of British engineering firms.

There is an immense amount of dormant influencein the engineering industry of this country, comprising, as it does, firms whose weekly wages bill amounts to over £2,000,000. It will be the business of the Association to transform that dormant influence into an active force to be utilised, not for the benefit of any individual manufacturer, but for that of the British engineering trade, so far as it is represented by the members of this Association.

MINING NOTES

Paracale Dredging Operations.—The new P.280,000 dredge which is being installed by the Philippine Exploration Co., on their claim at Gumaus was to be completed by the middle of September and the company expected to be taking out gold a couple of weeks later. Judge Frank B. Ingersoll, president and general manager of the company, states that an Australian company is working two dredges in the river at the town of Paracale. They had an old New Zealand dredge. This concern was incorporated as the Philippine Dredging Proprietary, Ltd. The Philippine Dredging Syndicate was operating a Risden dredge in the Malaguit River and was taking out about 300 ounces of gold a month. Up in the country at the junction of the provinces of Rizal, Tayabas and Nueva Ecija on the upper waters of the Umerai river the Luzon Gold Company was taking out gold, using hydraulic power.

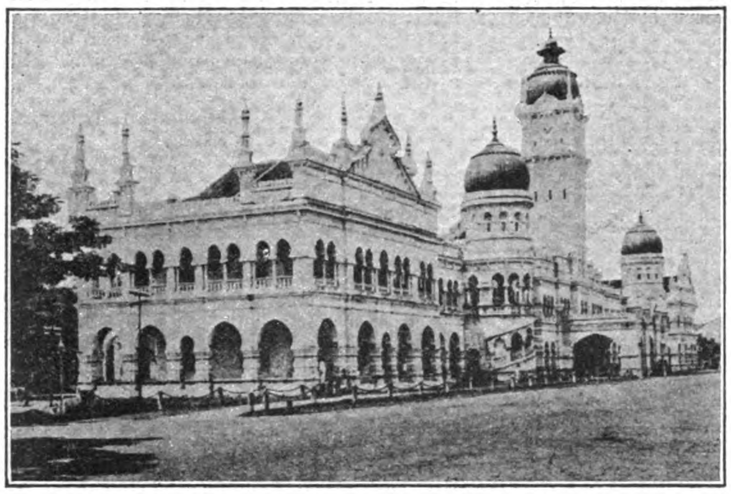
Siamese Tin.—The Siamese Tin Syndicate is regarded as having a future of promise, writes *The World*. Founded in 1906 to explore and prospect for tin, and to engage in general industrial enterprise in Siam, it secured strong backing in the market, which was largely due to the management being controlled by Mr. H. G. Scott, who was previously consulting engineer to the Siamese Government, which position he resigned to conduct the fortunes of the syndicate.

The chief asset of this undertaking is a tin property of 700 acres, situate about two miles from the sea, with which it is connected by a light railway. Before installing the dredger which is now in operation, the ground was carefully prospected, between six hundred and seven hundred boreholes having been drilled in the survey of the estate. Results are now being attained of a highly satisfactory nature, and working expenses are estimated not to exceed 15 per cent. of the total revenue.

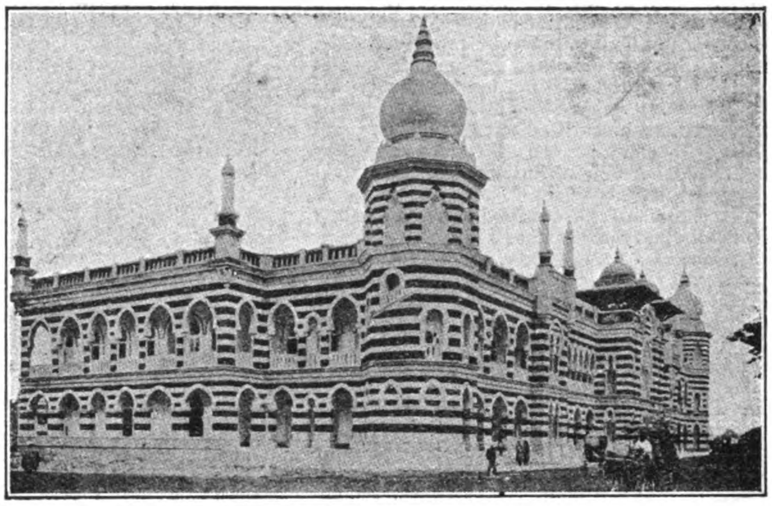
For the latest period of a fortnight, 21¼ tons of tin were produced. At the price of £144 a ton, this equals £3,060. If this rate should be maintained, it would mean a gross revenue for the year of £79,560, less working costs totalling £10,634, or a net result of over £68,600. This, however, is not regarded as the limit of possibility. Since the date of the last report, the issued capital of £100,000 has been increased to £120,000, the full amount authorised, and the extra £20,000 is estimated to have produced close on £40,000, or sufficient to provide two more dredgers, which will be ordered as soon as their designs are approved. The life of the property with three dredgers at work is estimated at seventeen years.

FEDERATED MALAY STATES RAILWAYS

By Commercial Agent D. C. Alexander, Jr.



F. M. S. GOVERNMENT OFFICES AT KUALA LUMPUR



HEAD OFFICES OF THE F. M. S. RAILWAYS AT KUALA LUMPUR

The Federated Malay States Railways, now one unified system controlled by the Federal Government, had their origin in a number of small lines constructed by the States of Perak, Selangor, and Nigri Sembilan between 1885 and 1903, in which latter year the Federal Government assumed control. These small lines were built for the purpose of connecting the principal cities of the various States with the nearest seaports, and were then gradually extended as the development of each State required. For example, the first line joined Taiping, then the center of the tin-mining district of Perak, with Port Weld, while the second was built between Kuala Lumpur, then capital of Selangor and now capital of the Federated States, and Port Swettenham.

In all, about 280 miles of line were in operation when the Federal Government assumed control, and the open mileage was increased to 559 by December 31, 1911. On that date there were also under construction 389 miles of new line, of which 137 miles (principally in the East Coast Division, are now completed, making a total of 696 miles. In addition, the railway administration operates, under lease, the Singapore (Island) Railway (19 miles) and the Johore State Railway (121 miles), making a total of 836 miles operated by the Federated Malay States Railway. All of these lines are of meter (3.28 feet) gauge and about 25 per cent of the Federated Malay States line is laid with 80-pound rails, the remainder being 60-pound.

New Construction Work—Motor-Car Service.

The so-called East Coast Railway, from Gemas northward through Pahang, is being rapidly pushed toward the Kelantan border, and the survey is now being made for the line through Kelantan which will connect the Federated Malay States Railways with the South Siam Railway, now under construction. During 1912 work will be begun on two branch lines, one from Padang-Java to Kuala Selangor, and the other from Bukit Mertajam to Alor Star, in the new Province of Kedah; the two lines comprise 89 miles. In all, about $3,000,000 will be expended on new construction in 1912.

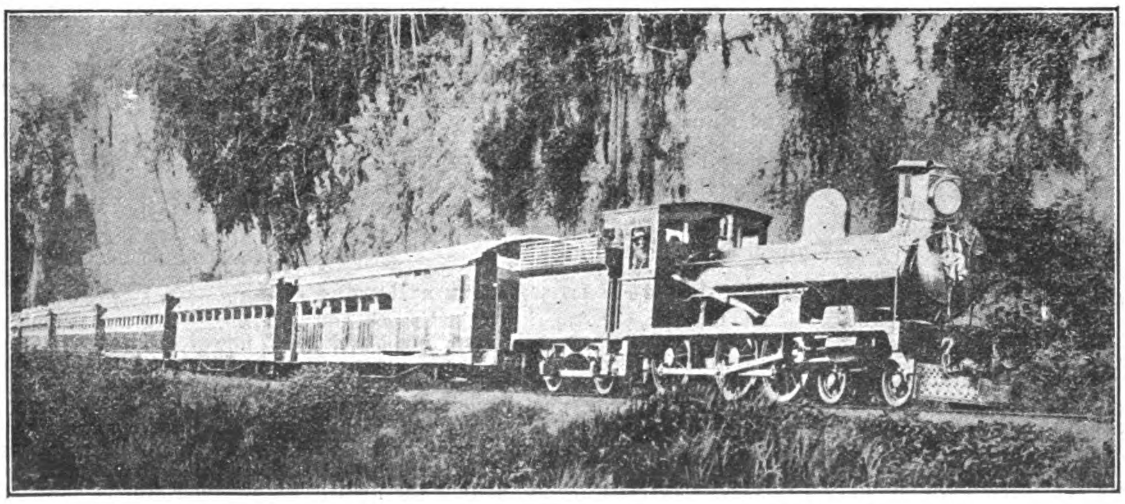
On December 31, 1910, the capital expenditure on 539 miles of open line was $29,004,350, or $53,889 per mile, while the net earnings in the same year were $1,263,470, or 4.35 per cent. In 1911 the net earnings increased to $1,870,326, which was 6.03 per cent on capital cost. As all construction charges have been paid from earnings and appropriations from the general revenues of the States, the railway has no indebtedness.

Besides its rail service, the railway administration now operates a motor-car service for passengers, mail, and parcels between Klang and Kuala Selangor (28 miles) and between Kuala Kuba and Kuala Lipis (80 miles). While this service, considered alone, has never paid its way (the loss in 1911 was $30,605), it has undoubtedly had the effect of increasing the earnings of the rail lines considerably and has contributed much toward opening up sections remote from the railway. In this, as in some other respects, the benefits of a State-owned line are obvious. In 1910, 45 motor cars were in operation, including 6 motor trucks, the total number of miles run being 311,254 and the total number of passengers carried 249,894.

Railway Equipment.

In February, 1912, there were in service 114 locomotives, of which 33 were of the Pacific type, 38 of the 4-6-0, and 43 smaller. Plate-frame construction, with copper fire boxes and stay bolts, is used exclusively, and all locomotives are from British builders, principally from Kitson & Co. and Nasmyth & Wilson. The overhauling and shopping of locomotives appears to be very thorough, yet the cost of repairs (wages and materials) was only $0.0312 per train-mile in 1910 and $0.0344 in 1909.

There are 2,229 freight cars of all classes in use. As in the passenger coaches, the underframes, bogies, and wheels are imported, while wood and plate work are constructed locally. Of 271 passenger coaches, 161 are third class and 66 are four-wheeled. All of the third-class and many of the first and second class coach bodies have been built locally, but some sleeping and dining cars have recently been imported. The new sleeping cars, which were built in England, are equal if not superior in roominess



EXPRESS TRAIN ON FEDERATED MALAY STATES RAILWAYS

F. M. S. RAILWAY WORKSHOPS, AT KUALA LUMPUR, LOOKING WEST

and comfort to any that the writer has seen in the United States, Europe, or the Orient. They are 57 feet long, 8 feet wide, and 11 feet 8 inches high, and vestibuled, corridor, compartment style. A novel feature of the design is that at the middle of the car the corridor crosses from one side to the other by a sharp diagonal. There are 8 two-berth compartments, each 7 by 5 feet, and each has four electric lamps conveniently arranged and built-in wash closets. In addition to the usual toilet rooms, each car has a small shower-bath room.

Central Workshops—Foundry—Forge and Boiler Shops.

The main shops are situated about 3 miles from Kuala Lumpur, where the railway administration has its offices. These shops are of brick and steel construction, and are, in general, well designed, except that the tracks in the erecting shop run lengthwise instead of transversely, which makes the handling of locomotives difficult.

Power for the works is generated at a Government-owned hydro-electric station at Gombak, some 12 miles away. The turbines in this station are from Escher, Wyss & Co., of Zurich, while the two 300-horse-power dynamos are from the Oerlikon Co., of Winterthur, Switzerland. Three-phase current is generated at 6,000 volts, which is transformed to 400 volts at the works. After 6 p.m. the same power plant supplies current for lighting the city of Kuala Lumpur. As a reserve a steam engine and 75-kilowatt dynamo are installed in a small engine room at the works, which also contains the transformers, switchboard, and an air compressor. This compressor is a small duplex machine, driven by a 25-horsepower motor, with the cylinders mounted upon the receiver, which results in a very unpleasant clatter when the compressor is in use.

The foundry contains one 5-ton cupola and two small brass furnaces but no molding machines. In the tube and bolt shop, which adjoins, there are three 1-inch bolt cutters from the Acme Machinery Co., of Cleveland, Ohio, and two forging machines from the same company. One of the latter machines was running rather noisily, either from wear or improper adjustment.

The forge and boiler shops now occupy separate bays in one building, but as the space has become too small a new forge shop has just been built close to the railway siding, which will be used principally for building and repairing cars and for general plate work. The present shop contains 19 smith and 22 round fires, and 2 steam and 1 motor pneumatic hammer. The latter, which is of 5 hundredweight, is from Nasmyth & Wilson, of Manchester, who have also supplied one 10-hundredweight steam hammer, while the other steam hammer of 5 hundredweight is from B. & S. Massey. There are also in this shop a case-hardening furnace, a spring furnace, and a spring-testing machine, the latter from J. Buckton, of Leeds.

The boiler shop is served by a 15-ton overhead traveling crane, three-motor type, with 5-ton auxiliary lift, and the equipment includes a single-acting triplex motor-driven pressure pump with accumulator, giving 1,500 pounds pressure, and 3 hydraulic riveters from Fielding & Platt, 1 stationary with 8-foot gap, and 2 portable. There are 3 combination punching and shearing machines, the largest from G. Wilkinson & Sons, of Keighley, having a capacity up to 1¼-inch plates. There is also a two-speed portable air drill, a plain radial drill, bending rolls, and a cold saw.

Machine Shop Equipment.

The machine shop is built in three bays. The central bay, the erecting floor, has three lines of rails through its entire length and two 20-ton overhead traveling cranes of the same type as that in the boiler shop. These were built by Ransomes & Rapier (Ltd.), of Ipswich, England. One of the side bays contains a tool room and workbenches, and the other bay contains machine tools of all classes grouped by kinds. Most of the more modern machines have individual motors, a few of the small ones being driven by group motors. In all there are some 80 motors, aggregating about 625 horsepower. Some of these are from the Oerlikon Works, one or two from the General Electric Co., of New York, and the remainder from the British Thomson-Houston Co., of Rugby.

The wheel-lathe section of this shop contains five lathes, one 48-inch swing, three 62-inch, and one 72-inch. Three of these, including the 72-inch lathe, are from Craven Bros., of Manchester; the others are from J. Butler, of Halifax, and from Shepherd & Hill, of Manchester. In all cases the working speed appeared to be considerably less than that customary in American and European shops. Most of the car wheels in use on this railway are of the built-up type, with tires shrunk on and secured by a modification of the Gibson ring. The standard sizes of wheels are 24 and 33½ inch.

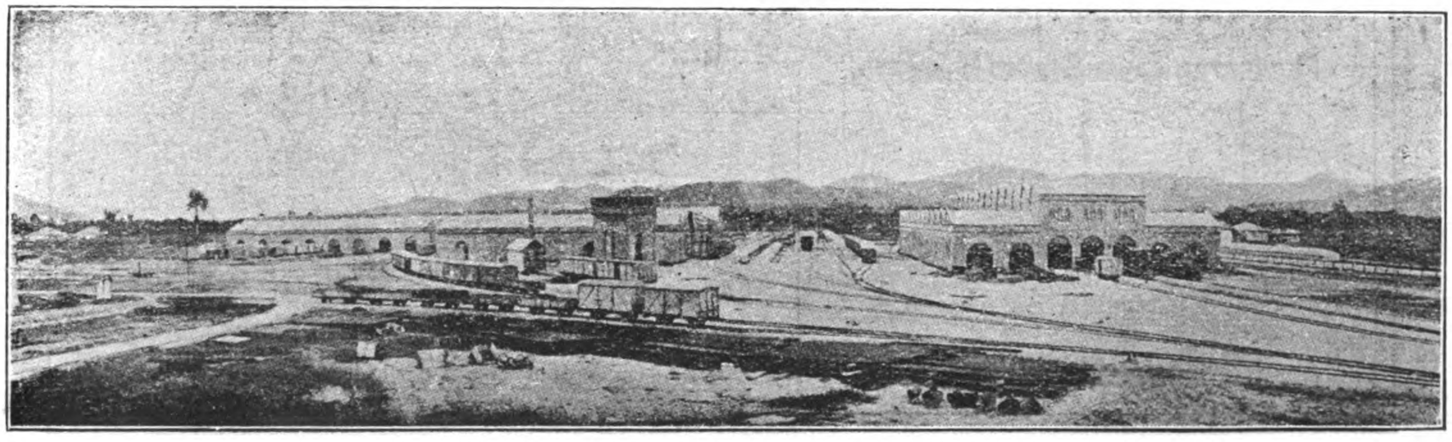
Few of the smaller machines are of particular interest, and, considering the comparatively recent date of their purchase, it can hardly be said that, as a whole, they represent the best possible choice. When new machine tools and machinery are required, a specification is sent to the Crown Agent for the Colonies, in London, who makes the purchase. The general manager of the railway states that, as a rule, the administration in Kuala Lumpur does not specify particular makers in the indents, preferring to give the Crown Agent a free hand in the selection, but that, if a particular machine is asked for, the Crown Agent will purchase and supply it.

Most of the engine lathes (ranging from 14 to 36 inch swing) and four capstan lathes are from John Lang & Sons, several having the patent variable-speed drive, which has not been altogether satisfactory here. Several of the smaller ones, used principally for brass turning, have a thread-chasing attachment, which is reported as very convenient. Shepherd & Hill have supplied two large lathes which were well spoken of, one of 36-inch swing and one 48-inch swing with 24 feet between centers, and two tool rests.

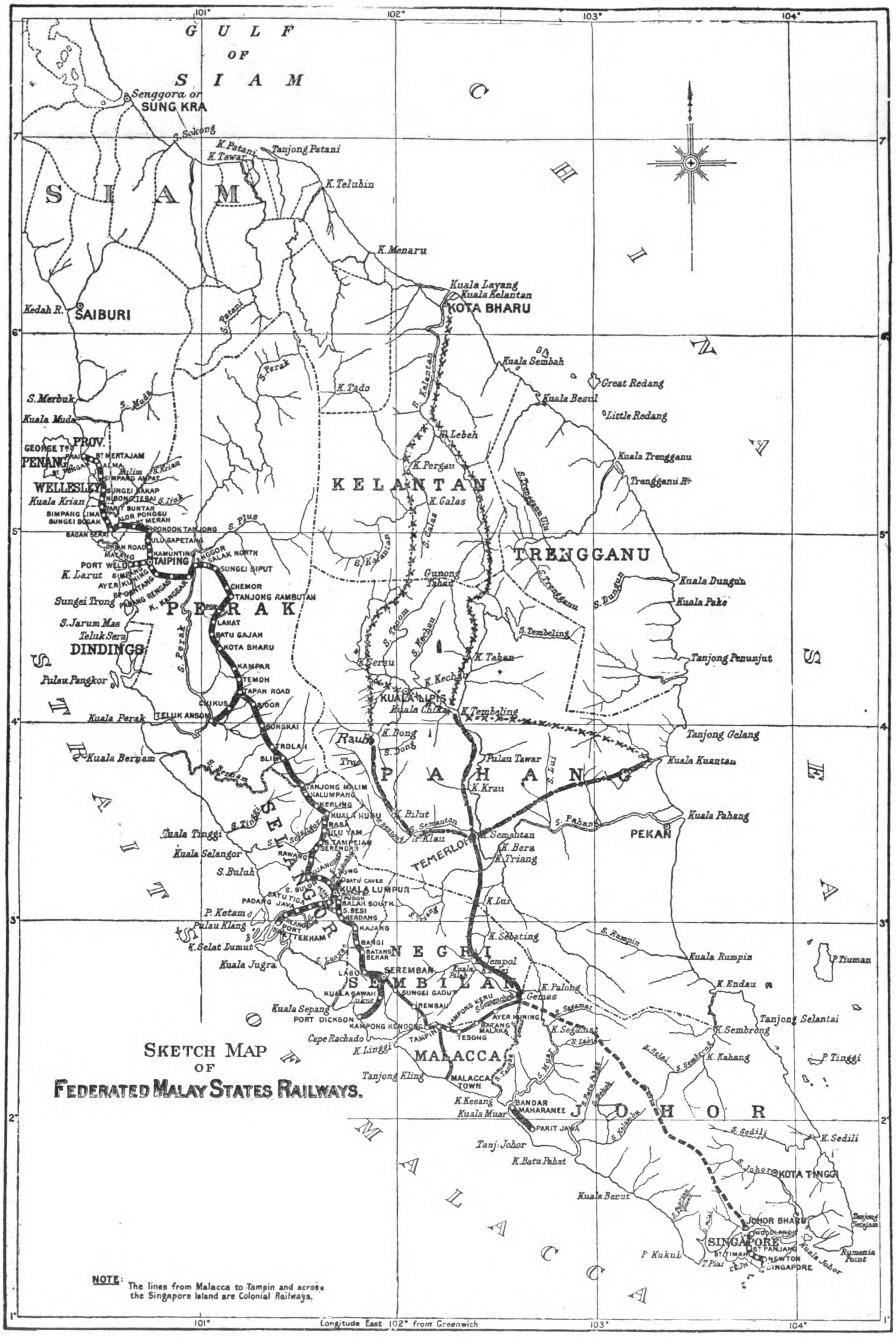
From Jones & Lamson, of Springfield, Vt., there are three flat turret lathes (two 2-inch and one 3-inch), which were most highly commended and showed no signs of wear; notwithstanding this fact, one of Alfred Herbert's No. 2 hollow hexagonal lathes has recently been ordered, and will be tested against the American machines.

In these shops the milling machine does not play the important part that it does in the best American and European shops. This is due partly to the inability or unwillingness of the workmen to utilize such machines as there are, and partly to the fact that the machines now installed are not equal to heavy work with modern high-speed milling cutters. The present equipment includes three universal and one 2-spindle vertical machines, the makers represented being Shepherd & Hill, Alfred Herbert, and Buck & Hickman.

William Muir, of Manchester, has supplied one horizontal boring, turning, and milling machine taking diameters up to 30 inches, and several upright drills, all excellent machines. There are three traverse shapers, and four planers of various sizes and makes (the latter rather underpowered), and one 30-inch vertical turning and boring mill with one head, from Smith & Coventry, of Manchester. The full possibilities of this type of tool do not seem to have been realized yet by the shop management.



F. M. S. RAILWAY SHOPS AT KUALA LUMPUR, LOOKING NORTH



THE DOTTED LINE FROM GEMAS TO JOHORE, INDICATING THE JOHORE RAILWAY IS NOW OPERATED BY THE F. M. S. RAILWAY ADMINISTRATION

Five sensitive drills are in use and two 6-foot plain radials, the latter from Craven Bros. and Shepherd & Hill. There is also a 24-inch slow-speed cold saw from Clifton & Waddell, and the usual wheel press, tire-drilling machine, and polishing and buffing machine. The absence of grinding machines in the machine shop has just been remedied by the arrival of a large plain grinder, with 10-inch swing and 12 feet between centers, manufactured by J. E. Reinecker, of Chemnitz. This machine has not yet been put into use.

The tool room contains a No. 1 universal tool and cutter grinder from the Norton Grinder Co., of Worcester, Mass., and a floor grinder from the same firm. The tool and cutter grinder was highly praised by the shop foreman. Workingmen's time is kept by two recording clocks from the International Recording Clock Co., of Rochester, N. Y., which are said to be very satisfactory.

WOODWORKING AND CARRIAGE SHOP.

All the woodworking machines are from British makers, principally T. Robinson & Son, of Rochdale; A. Ransome & Co., of Newark-on-Trent; and W. B. Haigh, of Oldham. The first named has supplied one large frame saw, one 2-spindle drill, one 4-side automatic-feed planer, and grinders for circular saws and planer cutters. From Ransome & Co. there are a large circular log saw with automatic carriage, one vertical boring and mortising machine, one tenoning machine, one horizontal board sawing machine, and an automatic band-saw grinding and setting machine. The Haigh machines are two hand-feed planers, two circular-saw benches, one 2-spindle shaper, two panel planers, and a panel scraping machine.

Where durability and strength are required, the wood principally used is chengai—a hard, red-colored, native wood, weighing 64 pounds per cubic foot. For interior work, meranti, a white, fibrous, native wood is employed to some extent, but is not altogether satisfactory since, on account of its coarse composition, it checks and splits and has very little strength.

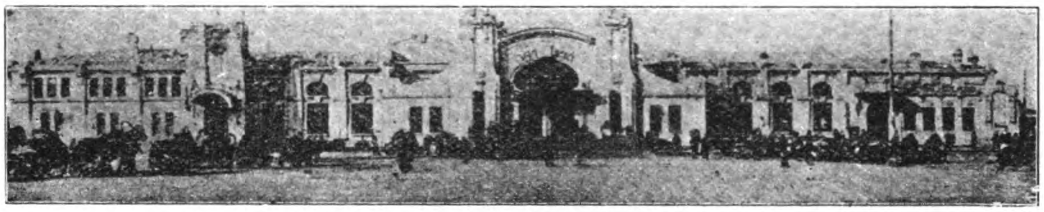
WORKMEN AND WAGES.

Throughout the shops a majority of the workmen are Chinese, the smiths, boiler makers, carpenters, pattern makers, and molders being of that race almost without exception. The machinists and fitters are principally Tamils (from the Madras Presidency of British India), though some Cingalese and Chinese are also employed for this class of work. The advantage of Tamil machine men seems to lie in the fact that they are more permanent in any employment than the Chinese and more open to instruction, though it can not be doubted that, in general, the Chinese are by nature the better machinists.

Wages are paid by time to most of the workmen, and are fairly high for this part of the world. Smiths and boiler makers receive $0.66 per 8-hour day, machine men $0.33 to $0.72, fitters $0.33 to $1.29, carpenters $0.41 to $0.77, and pattern makers $0.77 to $1.29. The rate for all apprentices is $0.16½. Most of the castings are made by contract with a Chinese master foundry man, who receives $0.77½ per hundredweight for iron castings, and pays his own helpers, the iron and fuel being supplied by the railway company.

It appears that American machine tools and woodworking machinery are not very well known among the managers of these shops, though several of them are men of wide experience in the best English railway shops. However, such American machines as are in use were generally commended, and the catalogues and proposals of manufacturers who can offer tools of special application and merit will doubtless receive interested attention.

DEVELOPMENT OF NORTHERN MANCHURIA, HARBIN



THE RAILWAY STATION AT HARBIN

SOYA BEANS

Practically the entire soya-bean crop of North Manchuria is shipped over the Chinese Eastern Railway through Suifenho, for exportation from Vladivostok. All the beans shipped from that port come from North Manchuria, so that the exports from Vladivostok give the most accurate figures obtainable of the foreign shipments of North Manchurian beans. Making allowances for stock on hand at the beginning and end of the year, it is estimated that 466,567 tons of beans were shipped during 1911, their estimated value at Harbin being $7,600,376. The average value per ton at Harbin in 1911 was $16.29. Expenses, bags, and freight brought the price f. o. b. Vladivostok up to $24.22.

The southern movement of soya beans through Kuangchengtzu and destined for the oil mills of South Manchuria or for exportation via Dairen or Newchwang is relatively small, although it was in 1911 undoubtedly greater than the 18,923 tons shown by the returns of the Chinese Eastern Railway. To take advantage of the lower freight rates of the South Manchuria Railway, which are designed to encourage the exportation of beans through Dairen, farmers in the southern part of this consular district cart their beans to Changchun rather than ship them north to Vladivostok via Harbin.

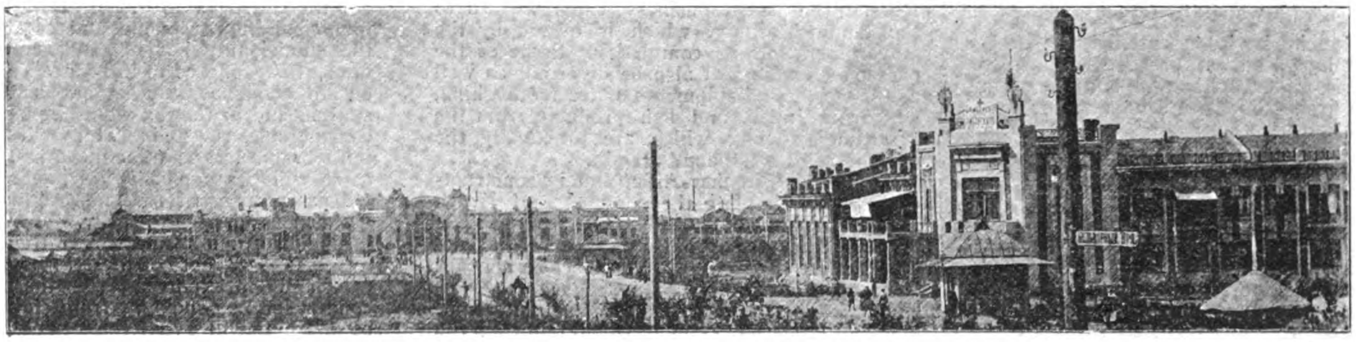
BEAN AND HEMPSEED OIL OUTPUT—BREWERIES

Scattered throughout this district are a number of small oil mills, but the methods used are very crude and the production is only sufficient for local consumption. One oil mill at Harbin produces hempseed oil specially prepared for use in paint. This mill has a capacity of about 22 tons of hempseed a day, from which 20 per cent of oil is obtained. The prices per pound obtained were as follows: Light color, first grade 71 cents, second grade 57 cents; dark color, first grade 62 cents, second grade 60 cents. Hempseed is also shipped from this district to an oil mill at Nicolsk-Ussurisk, which produces oil for cooking and for paint. This mill consumes annually 4,000 tons of hempseed and 2,000 tons of soya beans, obtaining 22 per cent of oil from hempseed and 12 per cent from soya beans. Bean oil sells for 64 cents per pound at the mill, hempseed oil for 75 cents, and oil for paint for 85 cents. The bean cake is sold to Japan and the hempseed waste is ground for cattle feed and sold locally. Most of the beans and hempseed for this mill come from Manchuria, the rest being grown in Chosen near the border of the Maritime Provinces.

There are seven breweries in Harbin, with a total annual capacity of 337,500 gallons, and one at Imianpo Station, with an annual capacity of 67,500 gallons. Under an agreement among the Harbin brewers, only four of the seven breweries were operated in 1911.

MANCHURIAN INDUSTRIES—CANDLE MAKING—COAL MINING

Harbin has two candle factories and Fuchiatien two. One of the Harbin factories



MAIN STREET OF HARBIN, LEADING TO RAILWAY STATION

produced about 700 tons of candles during 1911. The other, a new one, was not put into operation during the year. The latter plant has a daily capacity of 100 boxes of 72 pounds each. The two Chinese factories at Fuchiatien produced 9,300 boxes in 1911, with a total value of $55,851. Candles made at Harbin sell for 8.8 10.7 cents per pound, those made at Fuchiatien for about 8 cents. About 30 per cent of stearin is used in making the candles. German stearin costs 10 cents a pound for the best quality and paraffin 5.5 cents a pound, delivered at Dairen.

One coal mine is operated in North Manchuria, about 20 miles from Manchouli. This mine is owned by the Chinese Eastern Railway, but is leased to a local capitalist, who is required to sell the coal to the railway company for 71 cents per ton at the mine. The coal is soft brown lignite, poor in quality, with a large percentage of moisture and slacks when exposed to the air. There is also great danger of spontaneous combustion. When the requirements of the Chinese Eastern Railway have been met, the lessee of the mine is at liberty to sell to other buyers, and has agreed to supply coal to the Trans-Bikal Railway for $2.266 per ton, delivered at Manchouli. During 1911 the sales to the Chinese Eastern Railway totaled 100,000 tons and to the Trans-Bikal Railway 45,500 tons.

Flour and Wheat—Sugar Mills

There are 10 flour-milling companies in the neighborhood of Harbin, which consumed 135,000 tons of wheat in 1911, the total output of flour being estimated at 92,412 tons. With the usual abundant wheat crops of this region, there is little opportunity for foreign flour to enter the market, except in case of a local crop failure. The freight rates per 2,000-pound ton for flour from Harbin to the principal markets are as follows: Blagovestchensk, steamship, $5.66; Khabarofsk, carload lots, $8.50; Iman, carload lots, $8.70, steamship, $4,25; Kuangchengtzu, ton rate, $2.60, carload lots, $1.64; Manchouli, ton rate, $8.30; Suifenho, ton rate, $6.17; Vladivostok, carload lots, local rate $7, special export rate $5.38. From April to October the railway rate to Khabarofsk is lowered to $7.08, owing to competition from the river boats, on which the rate is $2.83.

North Manchuria is essentially a wheat-growing country, but at present a relatively small area is under cultivation and the soya bean ranks first. Floods and heavy rains destroyed about 40 per cent of the wheat crop in 1911. The Chinese Eastern Railway moved 67,984 tons of grain as local freight in 1911, 158,839 tons as export freight, 928 tons as import freight and 2 tons as transit freight.

There is a sugar factory at Ashiho with a capacity of 7,300 tons of sugar a year, but competition with imported sugar and the small demand limited its output in 1911 to 1,500 tons of granulated sugar and 700 tons of cube. It planned to plant about 13,500 acres with sugar beets in 1912, supplying the Chinese farmers with free seeds, paying them $2.05 per acre for labor, and buying the beets at $2.12 a ton. An ordinary crop of beets will yield about 7 tons to the acre, and a good crop as high as 11 tons. Two thousand tons of granulated and 4,000 tons of cube Russian sugar, including the output of the Russian sugar factory at Ashiho, were sold along the Chinese Eastern Railway and at Harbin in 1911. The average wholesale prices per pound at Harbin were as follow: Chinese, white, 4.3 cents, brown, 3.5 cents; Hongkong, 3.7 cents: Japanese, 3.4 cents; Russian, cube, 4.8 cents, granulated, 3.8 cents; local, cube, 4.2 cents, granulated, 3.6 cents.

Distilleries—Tea Shipments—Timbering

Small distilleries are scattered throughout North Manchuria. The largest at Harbin, has an annual capacity of about 670,000 gallons, and about an equal amount is imported yearly from Russia. Harbin consumes about 108,000 gallons a year, about 675,000 gallons are exported annually to the Amur Province and to towns on the Chinese side of the Amur River, and the rest is distributed along the Chinese Eastern Railway. The average price of spirit is 44 cents per gallon. Vodka sells for 25 to 57 cents per gallon.

Railway Situation—Harbin's Prosperity Threatened.

The most important trade artery of North Manchuria is the Chinese Eastern Railway, to the construction of which this region owes its development. This road showed a profit in 1910 for the first time, the amount being estimated at $800,000. In 1911 it is estimated that the profits totalled $2,000,000. The private freight handled rose from 606,070 tons in 1908 to 1,361,026 tons in 1911, while the number of passengers carried in the latter year was 1,207,953. The grand total revenue of the road for the year was $9,667,423.

The completion of the Amur Railway may check Harbin's rapid growth, as any loss to the Chinese Eastern Railway is bound to react unfavorably on Harbin. The latter railway derives considerable revenue from transportation of the military and emigrants to the Russian Far East, business which will go to the Amur Railway, which is owned by the Government, on its completion. Some of the passenger traffic will also be diverted, as well as the westbound shipments of tea from China, silk from Japan, and fish products from the Maritime Province, which are practically the only items of westbound freight.

Should the Tsitsihar-Aigun line be constructed it will stimulate the commerce of North Manchuria, but will tend to further isolate Harbin and to divert part of the export freight from the Chinese Eastern Railway to the eheaper transportation via the Amur River to Nikolaiefsk. The proposed railway through Khiakta and Urga to Peking would shorten the distance for passenger traffic from Europe to China, but would cause Harbin to lose its present position as transfer point for this traffic.

To offset these losses it will be necessary to encourage lemburing and mining, as well as agriculture, to provide freight for the railway. The shipments of soya beans, great in themselves, are not large enough alone to support a railway. Although the growth of Harbin may be adversely affected by these changes, North Manchuria as a great agricultural district will be benefited.

River Navigation—Harbin's Commercial Turnover.

The Sungari River, the largest watercourse in North Manchuria, is navigable from the southern to the northern end of this district and as a trade route ranks second to the Chinese Eastern Railway. In 1911 the total number of vessels entered and cleared at the river customhouses of Harbin, Aigun, and Sansing was 8,600 of 965,003 tons. Of these, 2,142 of 837,749 tons were Russian steamers, 46 of 11,081 tons were Chinese steamers, and 6,412 of 116,173 tons were Chinese junks. The freight carried during the year by river vessels totaled 211,487 tons. The steamers of the Chinese Eastern Railway maintain regular service between Kirin and Taolaichao and between Bodune and Lahasusu from April to the end of September.

Notwithstanding the handicaps which the city of Harbin suffered in common with the rest of this district during 1911, the commerical turnover of the city during the year was about $40,000,000, including imports and exports as as well as local manufactures and consumption.

Plans for a Tramway—Effect on Imported Goods.

The Harbinski Viestnik, in referring to the proposed construction of tramways in Harbin, makes a plea to Russian subjects to become interested in the matter, so that the line may be built by Russians with Russian capital, and thus keep out non-Russians.

The matter of tramways is now being considered by the municipality, and the present plan is to try and float a 2,000,000 rouble ($1,030,000) loan, and if this is successful, to let contracts for the construction of a tramway, and other municipal improvements and enterprises. As the municipality has not sufficient security to offer, it is proposed to introduce a "pood tax" on all goods arriving at and leaving Harbin station, and as the tax would be high, it means considerable revenue. This will be a most unfavorable tax as affecting American goods, as it will be practically an import duty, and will be a means of forcing revenue from non-Russian foreigners to make up for the foreign firms now doing business in Harbin who refuse to pay taxes. Most of these firms are engaged principally in exporting from the surrounding country, and by shipping from stations outside of Harbin, will avoid the "pood tax," which falls almost entirely upon goods destined for Harbin. (Am. C. R.)

THE GREAT ADMINISTRATION BUILDING OF THE CHINESE EASTERN RAILWAY AT HARBIN

RAILWAYS

Chefoo-Weihsien Railway:—A meeting attended by upwards of 300 prominent Chinese was held at Chefoo on Sept. 6 to discuss the construction of a railway between Chefoo and Weihsien. A committee was appointed to make the necessary arrangements. It is understood, says the *China Tribune*, that the representations of a special committee of the China Railway Association, which had been dispatched there to call the attention of the local citizens, as well as Dr. Sun's speech at the capital in regard to his railway scheme, had principally to do with the summoning of this sudden meeting. The idea of connecting the two cities in question with a railway line is no novel one. Three years ago, some prominent people of Tengchow, Laichow and Chefoo got together and organized a limited partnership under the name of the Chefoo-Weihsien Railway Co. A plan was drawn up, the estimate was made out, and the work was about to be started. The scheme, however, remained unexecuted owing to the lack of necessary funds, through the unwillingness of shareholders to pay in their subscriptions. Whether or not the plan will take a tangible shape this time remains to be seen. The length of the railway is 660 *li* or nearly 330 kilometres, requiring a sum of $15,000,000 for its construction.

Toyama-Naoetsu Railway:—The Toyama-Naoetsu Railway which was to have been opened by the end of October, it is feared, will not be completed before next March, owing to the recent inundation which visited the regions. The Japanese Railway Board is now, however, concentrating its efforts upon the building of the railroad between Naoetsu and Itoigawa, which section received less damage than that of Itoigawa and Tomari. At the present rate of work it was expected that the railway between Itoigawa and Nadachi would be opened by November 3.

The Szechuen-Hankow Railway:—A Peking telegram dated September 23 states that the Szechuenese shareholders have agreed to the Central Government owning and constructing the Ichang-Kweichow section of the Szechuen-Hankow railway. The following are among the conditions agreed upon: (1) All the stations, houses, and materials for construction along the Ichang-Kweichow railway line will be turned over to the Government; (2) The funds left in the Szechuen Railway Co. will be used by the said Company for the development of other industries; (3) Should the Government see fit to choose another route than the one already decided upon, the Company will retain the right of constructing a line along the original route. The line constructed by the Company will be considered as a branch line to that constructed by the Government; (4) The Company will be responsible for all the liabilities thus far incurred.

Cebu Street Cars:—Mr. Martin M. Levering, according to the *Cablenews American* of September 24, received a cable from London capitalists agreeing to supply the money to equip the city of Cebu with an electrical street car system.

The bill for authorizing a street car system in Cebu was brought before the Philippines Assembly in 1910, but it was not until June 1911 that the franchise was granted to Senor Simplicio Rodis; at the time of the initiation of the scheme an English company had the money ready to organize a Cebu Car Company and to begin work, but the delay in getting the franchise through caused a temporary halt in the scheme as the English capitalists tired of waiting devoted the money to other propositions.

Six months ago, Mr. Martin M. Levering left for London to see what could be done to interest English capital in the matter and as a result of his work the plan has now been taken up by a group of capitalists who are putting three-quarters of a million pesos into the concern.

The chairman of the new company is Sir Frederic Fryer, former Lieut.-Governor of British Burma, and a member of the board of directors of the Rangoon tramways. Each member of the group is a man of financial prominence, and all are men who invest millions in each enterprise that appeals to them. Their advent into the commercial life of the Visayas is likely to prove one of the most important events in the commercial history of the Philippines.

S.M.R. Traffic Returns:—The South Manchuria Railway Traffic Returns for last September give Y.931,664, which is a decrease by Y.210,067 as against the corresponding period of last year. In the aggregate for the half-year from April, however, this year's increase over last year amounts to Y.588,412.

China's Provincial Railways:—The following circular, signed by H. B. M.'s Consul-General and issued to the British mercantile firms in Canton, is published in the Hongkong *Government Gazette* for general information:

"The undersigned is directed by His Majesty's Minister to inform British subjects that the Chinese Foreign Office have reaffirmed, in the case of provincial railways under commercial management, the principle laid down by the late Tsung-li Yamen, that loans contracted with foreigners are not valid unless they have been previously sanctioned by the Central Government."

Trang-Bangkok Railway.—It has been decided to open for traffic 90 kilometres (Trang Tong Song) of the Trang Division by the 1st December, 1912. At present only construction trains are running. Some, however, already take passengers and goods. The earnings are very encouraging. It is just three years ago since the work was started. Construction is being vigorously pushed on from half a dozen points between Petchaburi, Trang and Singora and the engineers are to be congratulated on the excellent progress made. By the time the line is through to Bangkok, the Trang Harbour and its approaches will have to be dredged, buoyed, and charted, so that the connecting mail steamers from Penang should have no difficulty in entering at all states of the tide.—*Siam Observer.*

The Kiangsi Railway.—Success is said to have crowned the efforts of the Far Eastern Industrial Promotion Company (To-a Kogyo Kaisha) which made repeated efforts to arrange a loan with the Kiangsi Railway and met invariably with failure. It is reported that the success is due to Mr. Kyohei Shiraiwa, director of the concern. The contract has been signed and terms are:

Amount	*Yen* 5,000,000
Rate of interest	6 per cent.
Redemption	10 years.
To remain unredeemed	16 years.

The company has paid £300,000 on account and Mr. Iyukuro Kadono, another director will, it is stated, visit Shanghai in order to turn over the rest of the money, that is £4,700,000. Arrangements are further made that the railway shall settle all its liabilities with the Industrial Bank, the Okura Gumi, Mitsui Ginko and several Chinese banks, to the amount of some £2,000,000 and that the remaining sum shall be deposited with the company at 6 per cent.—*The Far East.*

South Manchuria Railway Shops.—Work on the railway shops at Dairen was commenced in 1908, and after the work on the buildings was well under way the railway company sent a special engineer to England to purchase the necessary materials for the 13 buildings, including machinery and fittings. These materials were brought in between May, 1910, and August, 1911, in 21 steamers. The total cost of completing these shops will run close to $2,250,000. They have a capacity for repairing 27 locomotives, 36 passenger cars, and 130 freight cars. In addition to the 9 cars constructed for the Manchuria-Korea through-express line and 3 sleepers for the main line mentioned above, these shops constructed 17 electric cars for the Dairen street railway. The machinery set up during the year included four 30-ton electric cranes and 11 cranes, electric and hand, of 1 to 15 tons. The installation of 40 other cranes was about completed at the end of the year.

Six locomotives, 1 motor inspection car, 3 first-class passenger and dining cars, 3 sleepers for through traffic use with the Korean Railway, 3 first-class passenger and baggage cars, and 3 baggage and mail cars were constructed in 1911.

Hunan-Canton-Hankow Railway

Work on the Changsha-Chuchou section of the Hankow-Canton Railway proceeded in the usual leisurely manner for the first four months of 1911. In May, however, when the Imperial Edict decreeing the nationalisation of the trunk lines was promulgated, the management, anxious to be able to point to some substantial achievement as an argument against the impending foreign loan, started carrying on the work with feverish activity night and day. The result was that, with the assistance of improvised trestle bridges, they were able to run a train, though with considerable difficulty, from Chuchou to Changsha on May 28, whereupon the line was declared open for traffic. A few days later, however, the embankment collapsed some 7 miles out of Changsha, other breakdowns subsequently occurring elsewhere, and traffic was not resumed until September 10. Since that date one passenger train has been running each way daily, but no goods traffic has so far been attracted. The passenger receipts were said to average $100 a day.

At the end of the year only three steel bridges had been erected out of the 40 or more required for this section; the remainder were still temporary trestle bridges. The line is very badly laid and is far from safe, and will certainly require to be rebuilt before being fit for fast and heavy traffic. For the 33 miles between Changsha and Chuchou, with only two intermediate stops, 2½ hours have to be allowed, as a higher speed would be dangerous. To accomplish these results, as a native paper points out, nearly 5,000,000 Changsha taels (some £625,000) have been expended, including the cost of the rolling-stock (4 locomotives, 12 passenger cars and 20 freight cars); and, as stated above, the receipts total some $100 a day.

No orders of any importance were given to foreign firms during the year, except for a railway work-shop at Changsha. The total cost came to about 12,000 Changsha taels (some £1,570). About one-third of this order went to a German firm; the balance was made up of second-hand machinery purchased in Shanghai. I am informed by an engineer who has inspected the work-shop that there is very little to show for the money expended and that the machinery is of an inferior description.

The railway has been connected at the Chuchou end with the line from P'ing-hsiang, so that the coal from the mines might be carried by rail instead of by boat as far as Changsha; but so far these hopes have not been realised, presumably owing to the bad construction of the line and to the lack of shipping facilities at this end.—(C. R.)

INDUSTRIAL

Cotton Mills in Japan

Considerable activity was shown toward the close of 1911 in the formation of new cotton-spinning companies and the extension of old ones, fostered by the low price of yarn, and it seems likely that 1912 will see more or less of a boom in the industry. Among the new companies in course of formation are the Hitaka Spinning Co., in Wakayama Prefecture, with a capital of $500,000, to supply yarn for the weaving of cotton flannel, and the Naniwa Spinning Co., of Osaka, capital $500,000, whose purpose is the manufacture of towels and knitted goods. The Mitsui Bussan Co., is also reported to be promoting a large weaving and spinning company at Osaka. Several other companies are reported as about to be formed more especially to engage in the manufacture of knitted goods and hosiery for the Chinese market.

The total number of spindles of new companies nnd the increase in the number of existing companies is about 180,000, while the new capital to be invested is about $10,000,000. The old companies, with the number of spindles to be added by each, are the Kanegafuchi, 30,000; Tokyo Spinning Co., 10,000; Godo 20,000; and Fukushima, 20,000. The new, companies, with the number of spindles run by each, include the weaving company of the Mitsui, 20,000; Knitted Goods Spinning Co., 10,009; spinning company of Mr. Taniguchi and others, 20,000; Hitaka Spinning Co., 10,000; Terada Spinning Co., 10,000; Nyuzen Spinning Co., 10.000; and Naniwa Spinning Co., 10,000.

Japanese Cotton Mills in China—Source of Cotton Supply.—The fact that raw cotton is imported from China to Japan, whence it is exported back again in the form of yarn and piece goods, is interesting Japanese capitalists in establishing, cotton mills in that country. This tendency may in time have a serious effect on the export of yarn to China. In Shanghai the Japan Cotton Spinning Co., of Osaka, is conducting a spinning mill with 18,000 spindles and the Naigai Wata Kaisha of Osaka one with 20,000 spindles, while the Mitsui Bussan Kaisha is running, in the name of a trust, the Shanghai Spinning Co., (a Chinese concern) with 60,000 spindles and 520 looms, and the Wuchang Spinning Co., (also a Chinese concern) with 90,000 spindles and 750 looms for weaving. It is said that the Mitsui Bussan Kaisha has under its control in China 220,320 spindles and 2,500 weaving looms.

The Japan Cotton Co., proposes to increase the spindles of the Shanghai mill by 10,000 and after a while by 10,000 more, while the Naigai Wata Kaisha also proposes to increase its spindles to 50,000. The Mitsui Bishi Co., which hitherto has been interested in cotton spinning in China only in a small way, has now succeeded in acquiring a Chinese cotton-spinning mill at Shanghai, named the Sing Hwa Mill, with 1,000 spindles

Electric Light, Power, and Tramway Enterprises in Kyushu.—The electric-light, power, and tramway enterprises had an unprecedented boom in this district in 1911, some 41 different electric projects, including 5 tramways, having been inaugurated in Kyushu and Okinawa-ken, of which 25 have begun work.

Eukuoka Prefecture in the northern central part of Kyushu leads in electric companies with 8 working and 5 in course of construction, Oita Prefecture has 5 working and 3 under construction, Nagasaki Prefecture 3 working and 2 under construction, Kagoshima 2 working and 3 under construction, Saga 2 working and 2 under construction, Miyazaki 3 working and 1 under construction, and Kumamoto and Okinawa each 1 working.

The island of Kyushu is well adapted to electric development, having many streams capable of being utilized for power, and extensive coal-mining areas with cheap fuel for steam power.

The Hakata Electric Light & Tramway Co., of Hakata in Fukuoka Prefecture, has been in operation a little more than one year and is quite successful, having declared a dividend of 12 per cent. for 1911, The Nagasaki Electric Lighting Co. has made some improvement in its plant and will enlarge it considerably to meet the increased demand for light and powei, which the old plant is too small to supply. A dividend of 8 per cent. was declared for 1911.

THE CHINA STOCK & SHARE HANDBOOK, 1912

The scope of this publication has been considerably extended and it can now claim a place among the books of reference devoted to the Far East. For many years the lack of accurate information in regard to joint stock companies operating in this field has been felt but until Messrs. H. E. Morris and C. R. Macguire last year conceived the happy idea of compiling the *China Stock & Share Handbook*, no attempt had been made to present the statistics in a handy and convenient form. While the volume issued in 1911 found ready acceptance among the investing public, it did not fulfil the desires of the compilers and it was determined to make the issue for 1912 an improvement in every way. This ambition has been achieved.

The book is divided into sixteen sections, and an idea of its scope can be obtained by a glance at the headings. The sections comprise: Stock Exchanges, Banks and Financial Institutions, Rates of Exchange, Loans, etc., Docking and Engineering Companies, General Store Companies, Hotel Companies, Industrial Undertakings and Manufacturing Companies, Insurance Companies, Land and Building Companies, Loan and Mortgage Companies, Mining Companies, Plantation Companies, Shipping Companies, Spinning and Weaving Companies, Wharf and Godown Companies, and Tramways and Railways. The new rules adopted by the Shanghai Stock Exchange to safeguard the interests of the investing public are given in full in the first section, together with examples of the contract forms now in use amongst members of the Exchange.

Particular attention has been given to information relative to the rubber industry, and statistics are quoted showing the principal factors which rule prices, Great Britian's rubber plantation areas, etc., etc.

The China Stock & Share Handbook is printed at the office of the North China Daily News and Herald, Limited, and is sold at $3 nett.

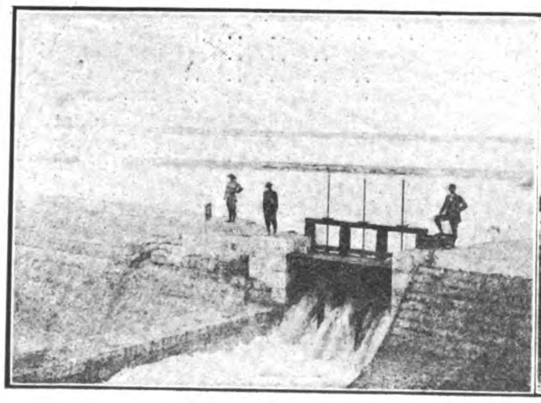
PROGRESS IN KOREA

KOREAN IRRIGATION SCHEMES

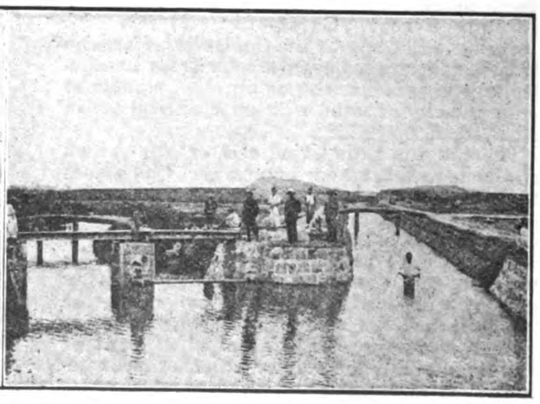
Agriculture being the principal occupation of the Korean people from remote ages, irrigation systems existed even in mediaeval times, so that barrages in rivers and irrigation reservoirs, thoroughly serviceable, were at one time provided in many places. These barrages and irrigating ponds were gradually neglected, however, until most of them were washed away or became deserted swamps. In July, 1908, an instruction was issued to all District Magistrates to investigate the existence and names of these irrigating barrages, dams or ponds, and about 4,000 have been reported. With the object of improving these water utilization measures, the Government caused those interested in irrigation in a district to form a so called water utilizing association, as far as circumstances permitted, by promulgating Regulations concerning Water Utilizing Associations in March 1906. Such Associations being authorized to levy from their members the necessary expense, labour contributions or articles, the construction or improvement of barrages or reservoirs, and their maintenance or protection are to be conducted by the association. Irrigation measures were of especially urgent necessity in the regions where the *Bankei* and *Toshin* rivers flow in North *Zenla* Province. These regions have vast tracts of paddy-fields, and in a year of drought, rice plantation often fails there over a wide expanse, as was the case in 1909 when more than 10,000 *cho* produced nothing. Consequently a detached office of the Model Farm at *Kunsan* was directed to carry out improvement of water utilizing measures in these regions. Meanwhile Water Utilizing Associations have been formed in several places.

A. Yokkuko Western Water Utilizing Association.—This association being the earliest organized in the Peninsula, its organic regulations obtained official approval in February 1909. Its irrigation district covers 277 *cho* of rice-fields in the *Kunsan* prefecture. The irrigation and draining are to be conducted by constructing river barrages and repairing old embankments.

B. Kinyeki Water Utilizing Association.—The organization of this association was officially approved in November 1909. The



THE FIRST BARRAGE



CANAL ROUTE

districts to be irrigated extended over *Yekisan*, *Rinpa* and *Kwanyetsu* in North *Zenla* province, and covered an aggregate area of paddy-fields measuring 3,000 *cho*. The irrigating water is to be taken by improving a reservoir called the *Yokyo* dam, covering an area of 810 *cho* and such that the dam can store a volume of water amounting to 600,000,000 *cubic shaku*, which serves to irrigate 3,000 *cho* of land. A loan amounting to 200,000 *yen* being raised, the construction work of the reservoir commenced in March 1910 and was completed in May 1911.

C. Mitsuyo Water Utilizing Association. — The regulations for forming this association were officially approved in April 1909. Its irrigation district covers 400 *cho* of paddy-fields and 233 *cho* of uplands located between the *Rakuto* (*Naktong*) and *Mitsuyo* (*Milyong*) rivers in the *Mitsuyo* district of South *Keisho* province. The principal object of this association is to irrigate the aforesaid lands by using canals connecting with these rivers in the dry season, and to prevent floods by improving the adjacent embankments.

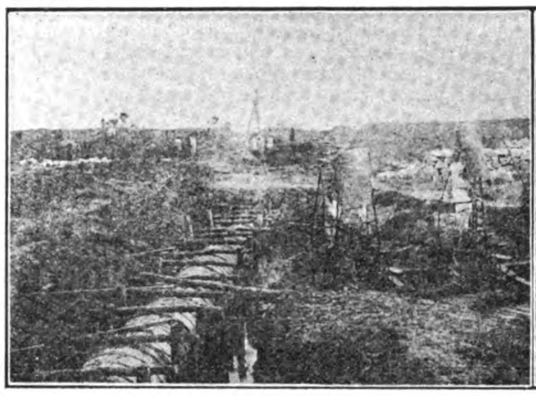
D. Rensan Water Utilizing Association.—This association has to provide irrigation facilities for two areas, measuring 80 *cho* and 190 *cho* respectively, of waste land by improving a ruined reservoir and constructing small canals. The juridical existence of the association was officially recognized in April 1909, and the civil engineering work was commenced in June 1909 and completed by July 1911.

E. Zenyeki Water Utilizing Association.—Its juridical existence was approved in March 1910, and the irrigation district covers about 1,000 *cho* of land contiguous to the *Zenshu* and *Yekisan* districts of North *Zenla* province.

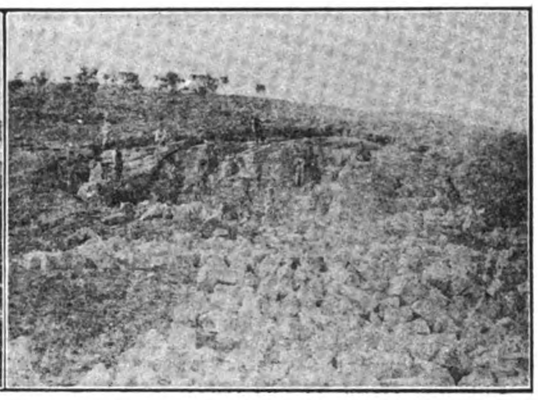
F. South Rinyeki Water Utilizing Association. — This association has to irrigate about 2,400 *cho* of a vast tract of cultivated land lying in the *Yekisan* and *Rinpa* districts of North *Zenla* province by taking water from the upper reaches of the *Bankei* river.

In addition, the *Rinyeki* Water Utilizing Association is planning to provide irrigation facilities for 4,000 *cho* of land contiguous to the *Rinpa* district and *Kunsan* Prefecture by building a bank along the left coast of the *Kinko* river in order to preveut the invasion of salt water, and by bringing river-water from the upper stream.

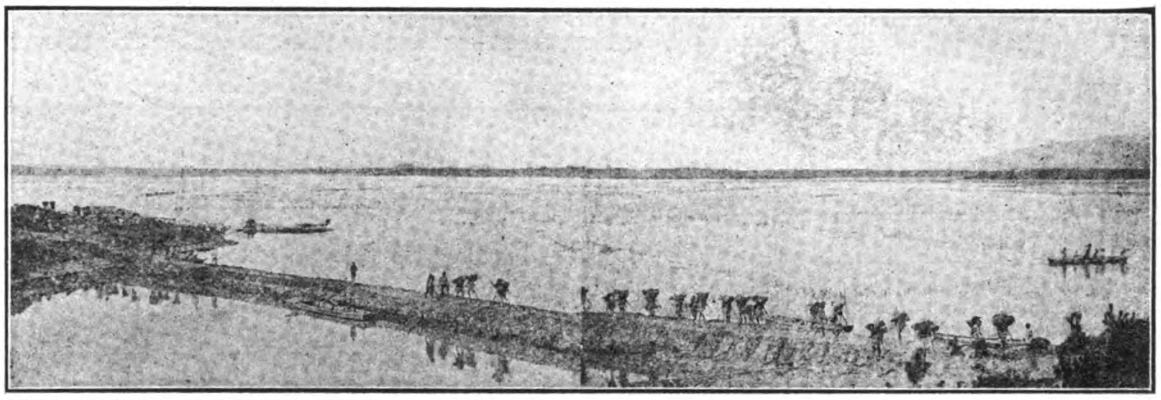
Another association also, called the *Toshinko* Water Utilizing Association, is planning to irrigate about 4,000 *cho* of the cultivated lands lying between the *Kintei* and *Bankei* districts by obtaining water from the *Toshin* river. For these water utilizing associations, the Agricultural and Industrial Banks are providing funds as circumstances permit.



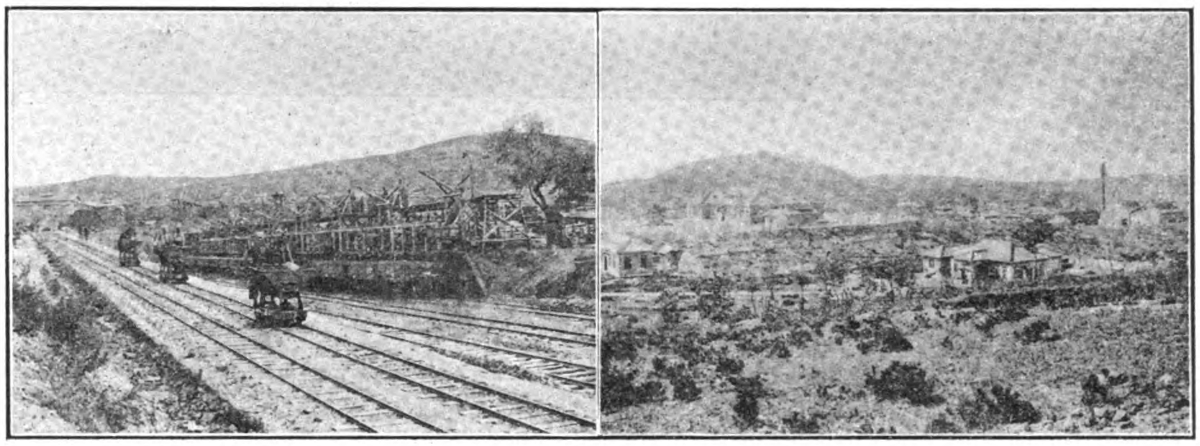
DRAIN PIPE ROUTE CONSTRUCTED WITH WOODEN TUBES BY SYPHON PROCESS



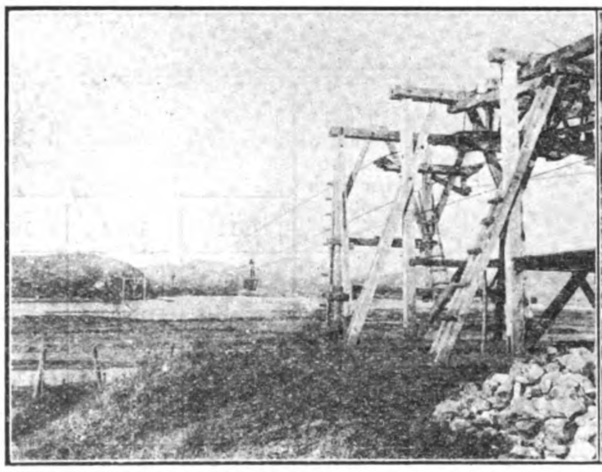
STONE QUARRYING FOR RESERVOIR CONSTRUCTION



THE TOKYO RESERVOIR MAINTAINED BY THE RINYEKI WATER UTILIZING ASSOCIATION



KOREAN GOVERNMENT COAL MINING STATION AT JIDO, NEAR HEIJO



AERIAL TRAMWAY AT COAL MINES

KOREAN MINERS

HEIJO (PYING-YANG) COAL MINES

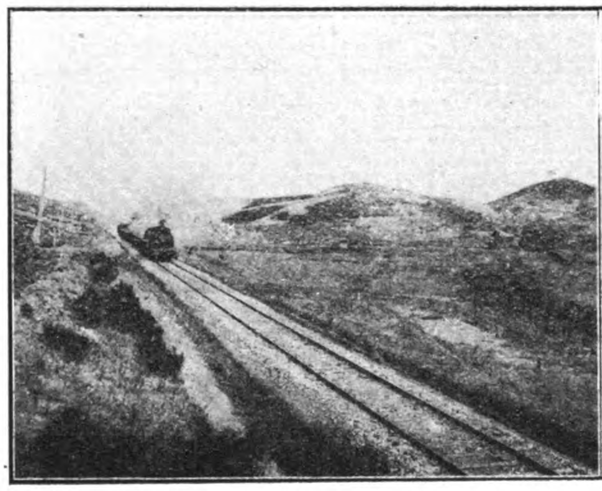
(KOREA)

Along the main-stream of the *Daido* (*Tai-dong*) River and its tributaries, in the neighbourhood of *Heijo*, beds of powdered anthracite coal are found extensively, the veins being about 13 *ri* (32 miles) in length and 3 *ri* (7½ miles) in width. Their position forms the letter Y. Such being the general feature of the mine, its products should be rich. With a view to augmenting the State revenue as well as affording a livelihood for the people around the coal districts, the Resident-General caused the Korean Government to undertake coal mining, and the *Heijo* (*Pying-yang*) Coal Mining Station being established in 1907, the digging out of coal, the making of coal briquets and the sale of these products were conducted by this station under the control of the Department of Agriculture, Commerce and Industry of the late Korean Government. In the sequel of Annexation, the Coal Mining Station was brought, in October, 1910, under the control of the Government-General and its organization was somewhat changed. The Vice-President hitherto employed at the station being abolished, the staff now consists of the President, a permanent Secretary, two permanent Technical Experts and eight Clerks and Subordinate Experts.

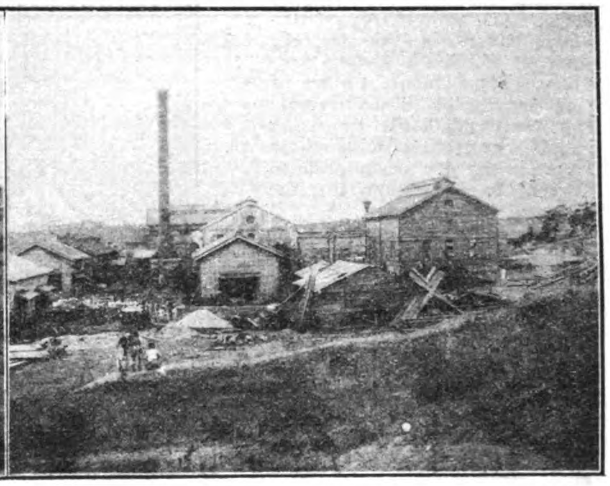
The extension of this coal mining which was commenced in 1908 at an expense of 150,000 *yen*, as a first stage, was completed in 1910. Improved boiling machines and diamond drills, winding engines, etc., being set up, the producing capacity has been considerably increased. A modern machine for coal briquets manufacture has been installed. Further, a railway running 7 miles and 12 chains between *Heijo* station and the mine districts being completed, better transport facilities are afforded for the sale of coal and coal briquets. Should another extension, planned as a second stage at an estimated cost of 760,000 *yen* which was commenced in 1911, be completed, more than 100,000 tons of coal per annum will be obtained at much less expense.

During the year 1910 and the three months ended in March 1911, over 100,000 tons were taken out. The contract for supplying *Heijo* (*Pying-yang*) anthracite coal to the *Tokuyama* Coal Briquet Manufacturing Station of the Japanese Navy still being continued, 46,865 tons of coal out of the total output was furnished to the *Tokuyama* Station during the year 1910. The general condition of the business operations conducted by the *Heijo* (*Pying-yang*) Coal Mining Station, as compared with the preceding year, is as follows:—

Year	Amount of coal taken out	Amount of coal sold	Price received for sale	Expenses of mining operations and of extension works	Number of Employees engaged by the day
	ton	*ton*	*yen*	*yen*	
1910	100,173	99,466	761,045	1,246,182	291,185
1909	53,493	47,218	219,422	355,551	163,432
Increase (+) or Decrease (−)	+ 46,680	+ 52,248	+ 541,623	+ 890,631	+ 127,753



RAILWAY EXTENSION TO COAL MINES



COAL BRICQUET FACTORY

KOREAN HARBOUR IMPROVEMENT WORKS

With the object of improving customs facilities and harbours at open ports, reclamations or dredgings, constructing office buildings or go-downs of customs houses, and other engineering works were commenced, soon after the establishment of the Japanese Protectorate in the Peninsula. A fund of 3,644,546 *yen* apportioned for these enterprises, which were to be carried out during five years from 1906, was subsequently increased to 4,900,830 *yen* as the original plans for the five years' consecutive works were modified to eight years. These improvement works in 11 sea-ports and 3 interior cities along railways—*Jinsen, Fusan, Gensan, Kunsan, Mokpo, Chinnampo, Seishin, Joshin, Masan, Shingishu, Keijo, Heijo* and *Taiko*—were nearly completed by the end of the fiscal year 1910, except certain parts of works unfinished in *Jinsen, Fusan* and *Chinnampo*, and 3,817,022 *yen* out of 4,951,823 *yen* had been spent up to March 31, 1911.

The above improvement of customs facilities and work of harbour construction have been conducted as the first stage. But with the gradual growth of foreign trade in the Peninsula and the development of the railway system, further extensions of harbour improvements in *Fusan, Jinsen, Chinnampo* and *Heijo*, such as may offer adopting the system prevailing in China, was conducted by establishing a Board of Commissioners in 1885 independently of the Departments of State, a foreigner being appointed Chief Commissioner. Then the Japanese Protectorate in the Peninsula having been established, a Japanese Financial Adviser was appointed in November 1906, to succeed the Chief Commissioner of the Korean Imperial Customs Board. Hitherto the Customs Board had principally discharged the duty of collecting customs duties, but now reforms in customs administration having been inaugurated, the functions of the Board were extended to promoting transportation and light-house facilities. Moreover, for the purpose of maintaining uniformity in the State revenue, the customs receipts, which had previously been treated as an independent account, were transferred to the general budget from the fiscal year 1907, like ordinary taxes, and when the Government Departments were reorganized in 1908, the Customs Bureau was established in the Finance Department. The Director of the Bureau has charge of all customs administration, as well as facilities of ports and harbours, under the control of the Minister of Finance. Local customs' administration is conducted by four Customs Houses in *Jinsen, Fusan, Gensan* and *Chinnampo*; and by 6 Customs Branch Offices in *Kunsan, Mokpo, Masampo, Singishu, Joshin* and *Seishin*, all of which engage in collecting customs dues, inspecting harbours and ports and other matters concerning foreign commerce. Also Customs Guard Inspecting Stations were established in *Ulsan*,

Decription	Total amount of estimate for each port	Amount defrayed in consecutive years					
		1911	**1912**	**1913**	**1914**	**1915**	**1916**
	Yen	*Yen*	*Yen*	*Yen*	*Yen*	*Yen*	*Yen*
Fusan	3,824,060	902,845	1,090,125	857,220	973,870	—	—
Jinsen	3,483,394	533,394	600,000	600,000	650,000	650,000	450,000
Chinnampo	835,000	325,000	340,000	170,000	—	—	—
Heijo	129,375	62,960	66,415	—	—	—	—
Totals	**8,271,828**	**1,824,199**	**2,096,540**	**1,627,220**	**1,623,870**	**650,000**	**450,000**

Toyei, Gishu and *Yuki*, in addition to 19 other places, and Customs Bonding Stations were organized in interior cities—*Keijo, Heijo, Taiko* and *Ryugampo*.

The jurisdictional district of a local Customs House was hitherto limited to the regions adjacent to an open port on the sea coast. But with the growth of railway transportation, foreign trade came to be directly conducted in certain interior cities, and therefore the whole Peninsula was divided into four jurisdictional customs districts by a decree of the Finance Department issued on January 1st, 1908. Since, March 1910, administration concerning shipping and navigation was brought under the charge of the Customs Houses.

After Annexation, all customs administration was placed under the control of the Governor-General, and was carried out by the Revenues Bureau of the Finance Department of the Government-General and by the local Customs Houses. The jurisdictional districts of Customs Houses determined by the ordinance issued by anchorage for three steamers of 4,500 tonnage can be provided at one time. As to the construction of this wet dock, ground extending from the present customs compound to *Shato* (island) along the sea coast of the settlement street up to the foot of the Japanese park is to be reclaimed, and in the middle of the reclaimed ground a wet dock covering 30,000 *tsubo* of water surface and having a minimum depth of 26 feet is to be built toward the direction of the north east. A lock on the double-gates system is to be built to a length of 440 feet and a width of 68 feet, so that it can maintain a depth of 32 feet at neap tide or 43 feet at spring tide. A navigable route to the open sea from the lock is to be dredged to a depth of 14 feet at ebb-tide, and a training wall running 4,200 feet which will keep the water level of flood tide is to be built at the east side of the navigable route. The harbour improvement work in *Jinsen* is to be crried out in six years consecutive work from the fiscal year 1911.

Chinnampo.—For improving customs facilities and harbour equipment in the port of *Chinnampo*, 1,143,482 *yen* was apportioned as the first stage, out of which about 488,582 *yen* spent up to the end of the fiscal year 1910. The railway between *Heijo* and *Chinnampo* now being operated, the necessity of connection between land and wgter traffic in this port has been keenly felt, so that the original plan of harbour improvement has to be enlarged. Consequently, 180,000 *yen* being added to the balance of the originally apportioned fnnd (655,000 *yen*), that total—amounting to 835,000 *yen*—was designated for the furthur extension of *Chinnampo* harbour as the second stage of harbour improvement. In addition to the wet dock which was constructed in the first stage, an extensive landing basin of concave form is to be built by reclaiming a space of 2,600 *tsubo* on the east coast of *Hippa* island, and in order to connect the railway and the harbour space between the railway station and the barbour district covering 25,000 *tsubo* is to be reclaimed. A landing pier is also to be built at the extreme point of the landing basin. These harbour extension works in *Chinnampo* are to be compieted in the two consecutive years beginning from the fiscal year 1911.

Heijo.—Although land traffic between *Heijo* and *Chinnampo* is maintained by a railway, the water traffic between these places in largely carried out by junks along the *Daido* (*Taitong*) river. In order to make this transport easier, the so called *Unan* shoal is to be dredged to 4½ feet depth with a width of 240 feet; a landing pier running up-stream from the customs office compound full facilities for connecting land and water traffic, were planned as the second stage after Annexation. This extension programme, which was approved in the 27th session of the Imperial Diet, was to be carried out in 6 years' consecutive work from the fiscal year 1911, at an estimate of 8,271,829 *yen* as shown in the following table on page 231:—

Fusan.—For the improvement of customs house compounds and the harbour in the port of *Fusan*, 1,143,482 *yen* was spent in the first stage; and a large wharf for ocean steamers (of 3,000 tons) connecting with the railway, was built. However, *Fusan* becoming, on the completion of the *Antung-Mukden* line, the terminal of a world route, the extension of the harbour on a large scale was urgently needed. Consequently, in the second stage of harbour improvement, dredging to a depth of 38 feet at the deepest point; constructing a second wharf with an iron pier provided for ocean steamers from 3,000 tonnage to 20,000 tons; extension of landing facilities so as to connect with railways and wharves; and extension of a breakwater with a double line of stone embankments from *Soryo* in the diiection of *Fusanchin* so as to constitute a basin of 16,000 *tsubo* for the safe anchoring of small steamers and junks, are to be carried out during four years from the fiscal year, 1911, at a cost of 3,824,060 *yen*.

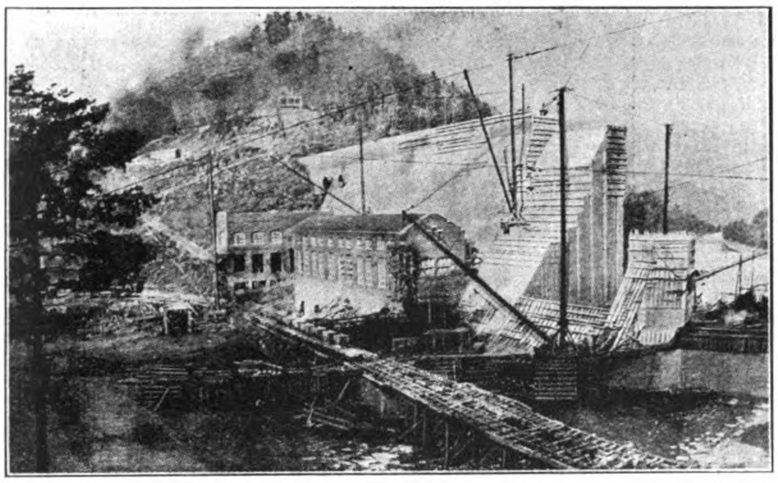
Jinsen.—For reconstructing the customs houses compound by reclaiming a lot measuring 17,978 *tsubo* and constructing office buildings, landing piers, ware-houses, etc., and for extending the railway, to the harbour, over 900,000 *yen* was spent in the first stage up to the end of 1910, This port is still important, as it leads the other ports in foreign trade. The second stage of extension, which will cost 1,483,394 *yen*, consists, chiefly of engineering work in the shape of harbour reconstruction, providing a wet dock system, as the mouth of the harbour is constantly silted up by the sand of the *Kan* (*Han*) river. This wet dock is to be built so that is to be reclaimed with a stone wall; and the navigable route between the customs office compound to *Unan* shoal is to be dredged to the depth of six feet at ebb-tide. A railway running about one mile is to be extended from the station to the customs office compound.

ELECTRICAL PROGRESS IN KOREA

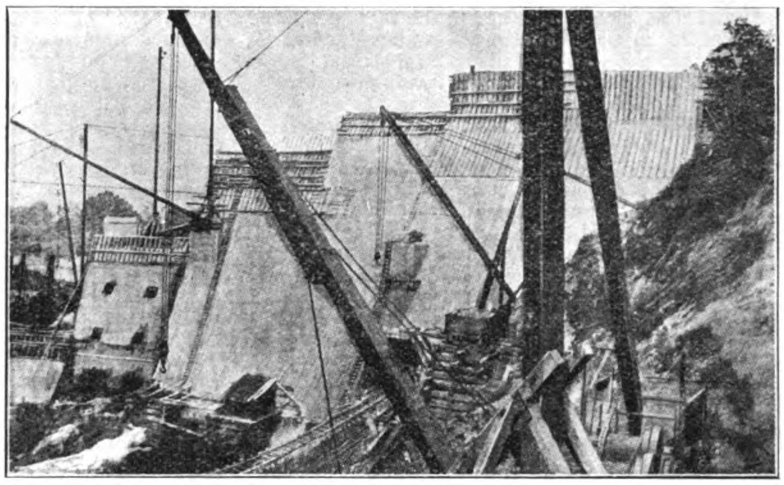
Business relating to electricity in the Korean Peninsula was originally supervised by the Japanese Local Residencies and the Home Department of the Korean Government. After Annexation, this supervision was transferred to the charge of the Communication Bureau. But there were no regulations for supervising business of this kind. By the Company Regulations promulgated in November, 1910, persons desiring to undertake electric work by organizing a corporation, should apply in accordance with this law. Since, however, the supervision of electric enterprises require special regulations, a body of Regulations for the Control of Electric Business was promulgated by Ordinance No. 24 of the Government-General issued in March, 1911, by which persons desiring to undertake electric business should apply to the Governor-General for permission; and which also provided for preventive measures against possible danger. Up to the end of the fiscal year 1910, the permissions given to applicants were 10 cases in all, and among these three have already opened the rest not having yet commenced. The following table shows details:—

	Name of Proprietor	Date, Permission given	Object of Business	Places where Electricity is Supplied	Capital: Authorized	Capital: Paid	Business Expense	Income	Profit
					yen	yen	yen	yen	yen
Companies that have opened business	Japanese Korean Gas Electric Co.	Jan., 1898	Electric Light, Electric Power, and Electric car	*Keijo*	3,000,000	2,400,000	182,389	287,143	104,753
	Jinsen Electric Co.	April, 1906	Electric Light and Electric Power	*Jinsen*	150,000	150,000	21,703	29,733	8,030
	Korean Gas and Electric Co.	......	Electric Light, Electric Power, Electric car	*Fusan*	3,000,000	750,000	28,074	46,178	18,104
Companies that have not yet opened business	*Chinnampo* Electric Co.	Aug., 1910	Electric Light and Electric Power	*Chinnampo*	150,000	25,500	....	....	....
	Branch office of Japanese Korean Gas and Electric Co.	June, 1910	Electric Light and Electric Power	*Masan*	100,000	100,000	....	....	....
	Taiden Electric Co.	Jan., 1911	Electric Light and Electric Power	*Taiden*	80,000	....	....	....	....
	Heijo Electric Co.	Jan., 1911	Electric Light and Electric Power	*Heijo*	300,000	....	....	....	....
	Yoshitake and 21 other persons	Jan., 1911	Electric Light and Electric Power	*Taiko*	100,000	....	....	....	....
	Ota and 4 other persons	July, 1907	Electric Light and Electric Power	*Gensan*	100,000	....	....	....	....
	Shibusawa and 9 other persons	June, 1906	Electric Light and Electric Power	*Roryosin*—*Yeitoho*	1,350,000	....	....	....	....

THE POWER OF OCOEE



THE DAM AFTER SEVEN MONTHS, THE PERIOD OF STREAM SIDE. DAM PARTIALLY COMPLETE



GREATEST ACTIVITY. VIEW FROM DOWN POWER HOUSE AND TRANSFORMER HOUSE TO THE LEFT

The evolution of *industrial civilization* has been accomplished largely at the expense of *nature's resources.* The development of the one has meant the inevitable loss of the other. Water alone furnishes a permanent supply of power; all other agencies are destroyed in their using. The use of water for power means the *conservation of fuel* and must eventually replace it in the industrial world.

Power now produced in America from all sources—coal, water, gas and oil—is estimated by the United States Bureau of Corporations at 30,000,000 horse-power, of which 6,000,000 horse-power is developed from water, effecting a saving of at least 33,000,000 tons of coal each year. The water power economically available for development is approximately 25,000,000 horse-power, the complete utilization of which would reduce to a minimum the consumption of our destructible resources and indefinitely postpone the day of their exhaustion.

It is through the development of *electric transmission* that water has, within a very short time, become one of the great factors in the production of power. Once confined to the locality in which it was produced, hydro-electric power can now be distributed over an area of at least 100,000 square miles; thus bringing it within the reach of established industrial centers and making it more and more formidable as a commercial competitor of coal.

The permanent character of the power supply encourages the designer of hydro-electric plants to build for all time. Thus these great masonry structures, together with their power houses and machinery, have come to be regarded as the greatest accomplishment of modern engineering skill and efficiency. The highly specialized knowledge and the financial resources necessary to make such developments possible have limited the number of firms capable of undertaking work of this character.

The installation of the Eastern Tennessee Power Company on the Ocoee River at Parksville, Tennessee, with its 38,000 horse-power ultimate capacity and a distributing range of over 100 miles in every direction, takes its place among the great water power developments of the country.

Constructed in record time, incorporating many features novel in their engineering significance and designed for permanency as well as operating efficiency, the Ocoee development becomes an enduring monument to its builders.

The Story of Ocoee

Rising in the mountains of Northern Georgia, the Ocoee River flows through a region of heavy rainfall in a northwesterly direction to a point near Parksville, Tennessee, where it joins the Hiawassee; in its course draining an area of more than 600 square miles.

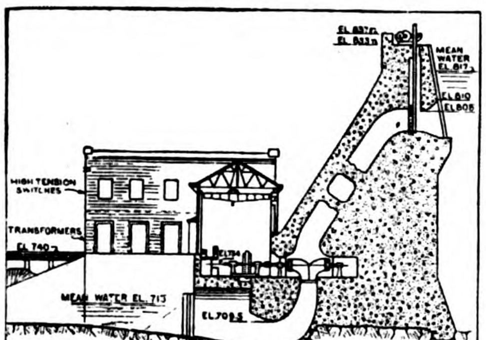
At Parksville the mountains have been cut by nature to form a deep and narrow gorge, above which the river flows for many miles through a broad and spacious basin—a location well suited to the purposes of water power development.

Where the valley is narrowest the great Ocoee Dam now stands, spanning a gap of more than 800 feet and filling the gorge to a height of 125 feet from the river bed. The river, held captive in the valley above, forms a lake eight miles long, covering an area 3½ square miles in extent and containing 100,000 acre-feet of stored water. To accomplish this, 155,472 cubic yards of concrete were placed in the dam in the record time of exactly one year from the date of commencing.

The dam is built throughout of solid Cyclopean concrete, 840 feet long at the crest, from 115 to 125 feet thick at its base, with a spillway 362 feet in length, capable of passing a flood of 45,000 cubic feet each second.

The penstocks, through which that portion of the water utilized for power reaches the turbines, are tubelike cavities left in the masonry of the dam. The water enters these at a point about 30 feet below the crest; thus permitting only the top layer, about 20 feet in thickness, to be used. The main turbine chambers are likewise located wholly within the dam.

The power house is situated immediately below the dam to the north of the spillway, its substructure being an integral part of the dam itself. The main building, 165 feet long and 35 feet wide, contains the generating apparatus. Four main generating units and two exciter units are in operation, and the additional main unit for which provision was made in the original plans is now being installed. The large turbines which are mounted on horizontal shafts and direct-connected with the generators are designed to produce 5,400 horse-power each when operating at the rate of 360 revolutions per minute under a pressure head of 98 feet. The generators, having a capacity of 3,000 kilowatts, are operated at a voltage of 2,300. In the wing to the north of the main building are housed the transformers and high tension apparatus. The transformers, four in number, which are oil insulated and water-cooled, increase the voltage from 2,300 to 66,000, at which the energy is carried over the transmission lines.



A SECTION THROUGH THE DAM AND POWER HOUSE AT MAIN UNIT

Additional Installations

The development originally planned had not yet been completed when the demand for power warranted proceeding with the installation of the reserve power units.

Besides the fifth main unit for which the power house was designed, the future increase in the capacity of the Parksville plant has been provided for by building two openings into the dam, to which penstocks will be attached, leading to a power house on the Company's property about 400 feet below the dam. This development furnishing 11,000 additional horse-power will be operated only for secondary power during periods of excess run-off.

The Company owns the necessary lands and water rights for additional water powers on the Ocoee River which falls some 600 feet in the 25 miles of its course above Parksville. A partial development of the power available along this course is also under way.

At a point about 13 miles above the Parksville plant, a 30-foot timber crib diverting dam will be constructed, from which the water will be conducted through a flume to a power house 5 miles below the dam, where, with a head of 250 feet, 20,000 horse-power will be generated.

The development of the water powers of the Ocoee River will eventually produce 75,000 horse-power, thus opening an extensive section of the south to industrial development.

The Available Power	H. P.
Total available power on Ocoee River ..	75,000
Total ultimate capacity of Parksville development	38,000
Capacity of turbines in Parksville power house	27,000
Capacity of secondary power development at Parksville	11,000
Capacity of second development on Ocoee River, now under construction	20,000

How the Work Was Done

Dam commenced February 1, 1911; finished February 1, 1912.

Between these dates 155,472 cubic yards of concrete was placed, working day shifts only.

The maximum ten-hour placement was 1,108 cubic yards.

The maximum monthly placement was 21,214 cubic yards.

THE IMPORTANCE OF CAREFUL PREPARATION.

August 7, 1910, preliminary work was begun.

A railroad six miles long connecting the dam site with the line of the Louisville Nashville Railroad was built to permit the importation of materials and supplies.

To expedite the beginning of actual work on the dam it was deemed advisable to commence work on the construction plant before the completion of the railroad.

A plant for the crushing of stone and the mixing of concrete, with a capacity of 1,000 cubic yards during each ten-hour working day, was in operation by February 1, 1911.

Dwellings for 1,200 people, office buildings, shops, storehouses, commissary and stables, were all erected during this period.

The camp consisted of three distinct divisions; the main camp on the north side of the river, the negro camp on the south side of the river, and the foreign laborers' camp about one-eighth of a mile to the west of the negro camp. With this arrangement there was very little intermingling of the various classes; and by operating the two laborers' camps independently, with a deputy sheriff in charge of each, order and discipline were maintained.

HOW THE CONCRETE WAS PLACED

With few exceptions, all materials were handled mechanically, and wherever possible with automatic devices.

From quarries in the mountainside just below the dam stone was loaded by steam shovels to the dump cars, hauled by donkey engines to the crusher plant, and there reduced to the required sizes of both stone and sand.

The materials thus supplied by one process were then carried by belt conveyors to the storage bins over the concrete mixers, into which they were fed by gravity.

The cement was supplied to the mixers in a similar manner, and the water from large storage tanks.

From the mixers the concrete was loaded into buckets having a capacity of two cubic yards, hauled on flat cars to the dam, hoisted by derricks and dumped between the wooden forms to the place of its destination.

By October, 1911, the power house had been completed and all the machinery installed.

THE TRANSMISSION LINES

The construction of the transmission lines was begun April 1, 1911, and on February 1, 1912, approximately 180 miles had been completed.

The power developed is transmitted at 66,000 volts over two 3-phase circuits, to Cleveland, Tennessee, a distance of 13 miles from the power house. At the switching station in Cleveland the lines separate and the current is carried over single circuit wood pole lines in three directions, 26 miles west to Chattanooga, Tennessee, 85 miles northeast to Knoxville, Tennessee, and 70 miles south to Rome, Georgia.

Special steel construction has been used wherever the lines cross railroads and rivers, or where for other reasons special strength is needed. On the Knoxville circuit the Tennessee River, which is navigable at this point, is crossed by means of an 1,800-foot span supported by steel towers 125 feet in height.

EASTERN TENNESSEE POWER COMPANY

The Eastern Tennessee Power Company was incorporated under the laws of Tennessee, July 16, 1910, for the specific purpose of constructing and operating hydraulic plants on the Ocoee River in Polk County, Tennessee, and with general power to improve and develop the water power of rivers and streams both navigable and unnavigable, and to sell electricity throughout the State. Arrangements have since been made for the sale of electric power in adjoining States.

MARKET

The company is selling electric current for light and power purposes, and has an abundant market for its product in Chattanooga, Cleveland and Knoxville, Tennessee; Rome, Georgia, and intermediate and adjacent points. Among the larger power users are the Chattanooga Railway & Light Company, the Cleveland Electric Light Company, a number of manufacturing plants in Chattanooga, Knoxville, Rome, Athens, and Cleveland, including numerous cotton and woolen mills.

The Ocoee development, including the transmission system, was designed and built by J. G. White & Company, Incorporated, of New York City.

The operation of the property is under the direct management of E. W. Clark & Company, Bankers, Philadelphia, and Hodenpyl, Hardy & Company, Bankers, New York City.

The Eastern Tennessee Power Company was originally financed by

Drexel & Company, Philadelphia
Hodenpyl, Hardy & Company, New York
E. W. Clark & Company, Philadelphia
J. G. White & Company, Inc., New York

A NEW ELECTRIC CENTRIFUGAL SUMP PUMP

To meet the demand for an automatically controlled pumping outfit, for draining basements, handling domestic sewage, pumping out bilges, etc., where the liquid collects in a sump, the Goulds Manufacturing Company, Seneca Falls, N. Y., have developed a new Centrifugal Sump Pump.

The outfit as shown by Fig. 1 consists of a vertical Electric Motor direct connected to a Goulds Single Side Suction Pump. The pump is connected to a cast iron pit cover, by a rigid pipe column. This cover also acts as a support

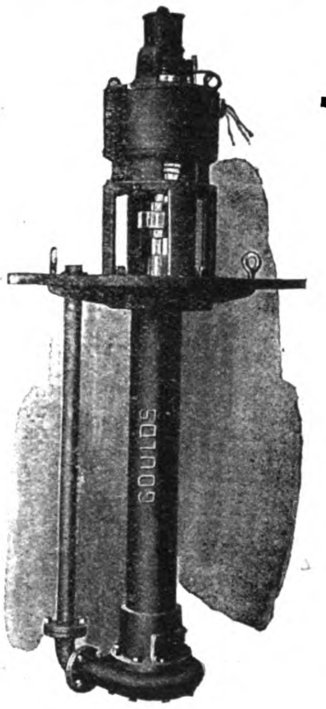


FIG. 1

FIG. 2

for the motor pedestals. The shaft is enclosed by the column which connects the pump to the cover and is therefore, protected from the liquid in the pit. A cover plate on the flange which connects the pump and supporting column permits inspection of the stuffing box.

The electric motor is controlled by a starting device, actuated by a float in the sump. When the liquid rises to a certain level and the float is lifted enough to close the switch the motor is started. It continues to operate until the sump is nearly empty, when the float drops back to the position where it opens the switch.

For service where electric current is not available, a similar pump has been developed, equipped with a pulley for belt drive by a gasoline engine or other power. This pump is shown in Figure 2.

The Papua Find.—The discovery of oil in Papua (British New Guinea) was one of the "flukes" often recorded in this connection. A native boy was chastised by a miner for putting kerosene in his tea. The boy stoutly affirmed his innocence and offered to show the miner the well from which the water was drawn. The miner found that the well was thickly covered with kerosene. Thus was discovered a field which is expected to develop into a huge commercial asset. If anticipations are realized the Government should compensate generously the miner for the outrage to his palate and the boy for the excoriation of his back.

Oil Companies in Burma.—The Burma Oil Company distributed a smaller dividend this year than last, but the shareholders have not much cause for complaint. The dividend was 15 per cent. against twenty per cent. the previous year. Not only has the company a large general reserve, but it has just put aside substantial sums for depreciation and other specific contingencies.

A new company called the Lower Burma Petroleum Co., Ltd. has been formed. It is a joint stock concern with a capital of £25,000 divided into 22,000 preference shares of £1 each, and 60,000 ordinary shares of the one shilling each.

FOOD WILL BE SERVED

A PLAN TO ACQUAINT THE PEOPLE WITH THE USES OF CORN.

The shortage of rice throughout the Philippines has called attention to the undeveloped possibilities of corn, which grows everywhere and lacks only the application of the proper methods in planting and cultivating to greatly increase its yield.

To this end the Bureau of Education has already instituted corn growing contests for the pupils of the public schools and is new arranging a series of demonstrations to show the preparation and use of corn as a table food. It is the intention to have these demonstrations in all the provinces, and at such times as to attract the attention of the greatest number of people. In addition to exhibiting the best corn to be found, the people will be instructed as to how to test and select their seed corn; how to use hand corn mills; also the different methods of cooking corn, and how to make hominy.

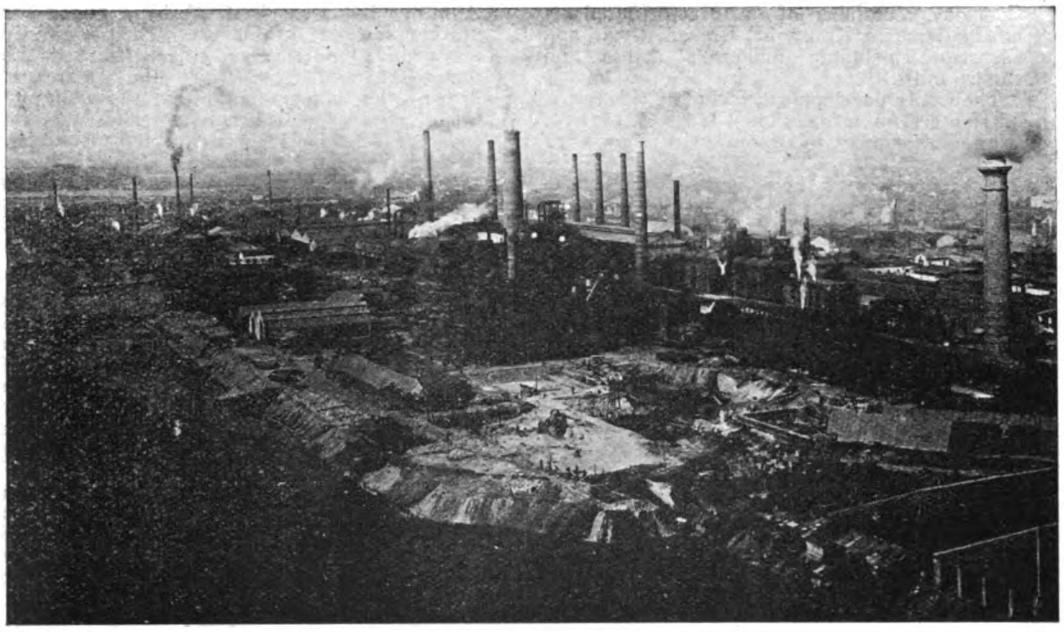
Food prepared from corn will be served free, and recipes in the dialects will be publicly posted and distributed to those interested. The demonstrators will show the actual preparation of food and it is thought that, in as much as the question of an adequate food supply is attracting the attention of the public, these demonstrations will receive the aid and approval of all. There can be no doubt but that such a campaign conducted throughout the Islands will be of great economic value provided it receives the full co-operation of the public, and it is to be expected that the leaders everywhere will take a personal interest in the movement.

Recognizing the truth of the well-known saying that the proof of the pudding is in the eating, the Bureau of Education in its campaign to encourage the production and use of corn is now sending out to all the schools a number of recipes showing how ordinary corn can be converted into palatable dishes.

These and other recipes are being introduced in all domestic science classes and the products of the recipes are being served in the dormitories and the various schools.

In order that the use of corn as a daily diet may be introduced among all classes of Filipinos only those are used which can be prepared with the ingredients and utensils found in the ordinary Filipino home. Where satisfactory recipes for preparing corn are found in any locality they are being copied and sent out to all the schools in the Islands.

It is thought, as a consequence of this plan, that corn as a table food will be held in higher esteem, thereby taking its deserved place as a daily ration and lessening in a measure the suffering that may be caused by the scarcity of rice.



THE HANYANG IRON AND STEEL WORKS

THE HAN YEH PING CORPORATION

GOVERNMENT CONTROL DESIRED

An extraordinary meeting of shareholders of the Han Yeh Ping Coal and Iron Corporation was held at the Chinese Y. M. C. A. at Shanghai recently. The corporation is said to have been in financial difficulties since the revolution and the meeting was called to consider two alternative proposals. These were as follows:—

Proposal A.:—To demand that the Government take over the Corporation as a State concern by purchase. This proposal was framed on the ground that inasmuch as the Corporation had suffered tremendous losses since and owing to the Revolution, and as order had not yet been restored everywhere, and the law was consequently without effect, future progress would be beset with difficulties beyond the resources of a private company to surmount. Moreover, as the Government, after the unity of the whole nation was achieved, would undertake extensive work of contruction of railway lines, large quantities of steel rails of the Corporation would be requisitioned.

Proposal B.:—This proposal is embodied in eight paragraphs as follows:—

(1) To cease at once the yearly payment of a fixed rate of interest to shareholders.

(2) To prolong the terms of loans from the foreign banks.

(3) To try to get the rate of interest on loans from the native banks and firms lowered, and to repay these loans gradually.

(4) To request the Government to stop taxing the iron, and to exempt machinery and materials purchased by the Corporation from import duty, and steel, coal and other products of the Corporation from the export duty.

(5) To request the Government to cease charging interest on, and to prolong the terms of, the loans lent to the Corporation by the Ministry of Posts and Communications, the Taching Bank and the Bank of Communication of the former Dynasty.

(6) To request the Government to give proper protection to the Company in its resumption of work and in the transport of its products.

(7) To demand the grant of a subsidy from the Government.

(8) To demand the right of priority for the Corporation in supplying all kinds of railway materials required by the Government in future.

There were present 573 shareholders, representing 163,903 shares, the number of votes that could be cast was 92,164. After the proposals had been explained a ballot was held, which disclosed 86,985 votes in favour of Proposal A, and 5,179 votes in favour of Proposal B; thus the first proposal was decided upon.

HARBOUR ISLAND TERMINALS, SEATTLE

In addition to extensive terminals now installed by six transcontinental railroads in this city, the Seattle Port District, March 5th, 1912, voted $8,100,000 for the construction of dockage facilities, including $5,000,000 for the acquisition of the site and erection of six concrete wharfs 1,400 feet long and 150 feet wide, accommodating forty large steamships at one time. This port expenditure is for the purpose of instituting terminal facilities similar to the Bush Terminals in Brooklyn, N. Y., and the city expenditures are to be duplicated by a New York corporation. This company plans to erect seventy buildings, including several six-story concrete industrial plants, for the accommodation of manufactories. Also modern storage warehouses with every facility for handling raw and finished products; in fact, every equipment known to modern science for the efficient assembling and distribution of commodities at the minimum of time and expense. The above sketch of the Harbour Island Terminals gives an idea of the proposed structures which the citizens of Seattle intend to install in the immediate future. Space, light, heat and power with unsurpassed rail and water facilities will be furnished manufacturers at rates which many now expend for cartage alone.

The Port of Seattle will spend twenty million in the next five years for harbour improvements alone. Gen. H. M. Chittenden, chairman of the Seattle Port Commission and former Government Engineer, sums up the proposed expenditure as follows:

Public Funds Pledged

Public Agency	Location of Improvement	Amount Pledged
U.S. government	Lake Washington canal	$ 2,275,000
State of Washington	Lake Washington canal	250,000
County of King	Lake Washington canal	750,000
County of King	Duwamish waterway	600,000
Assessment district	Duwamish waterway	1,000,000
County of King	Renton waterway	50,000
Assessment district	Renton waterway	50,000
Assessment district	Sammamish river	50,000
Port district	Smith's cove dock	1,000,000
Port district	East waterway dock	850,000
Port district	Central water front dock	750,000
Port district	Harbor Island (1)	3,000,000
Port district	Harbor Island (2)	2,000,000
City of Seattle	Harrison Street dock	25,000
County of King	Duwamish dock	350,000
Port district	Salmon Bay	350,000
Port district	Lake Washington ferry	150,000
Total pledged		$13,500,000

Funds, Public and Private in, Prospect

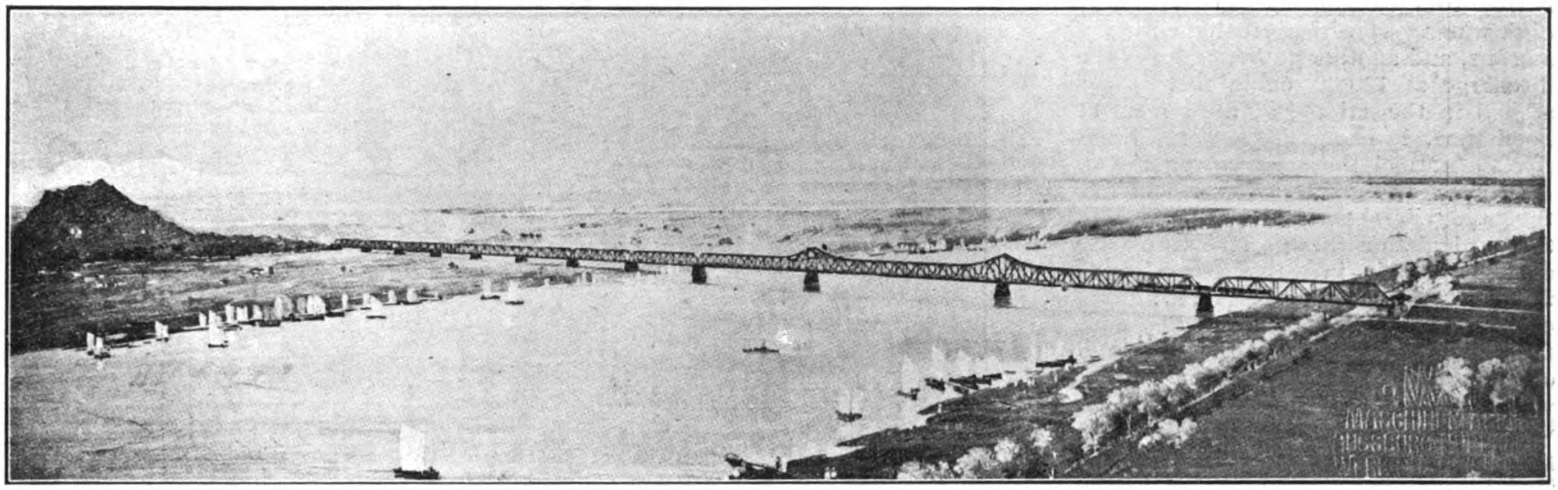
Terminal company	Harbour Island	$ 2,275,000
Post district	Projects on Elliott Bay and Lake Washington canal opened	1,750,000
U. S. government	Duwamish waterway	225,000
Local agencies public and private	Bridges, subways, dock and related improvements	2,250,000
Total		$ 6,500,000

Summary

Public funds pledged or in process of raising	$ 13,500,000
Public and private funds in early prospect	6,500,000
Total for Harbour in Next Five Years	**$20,000,000**

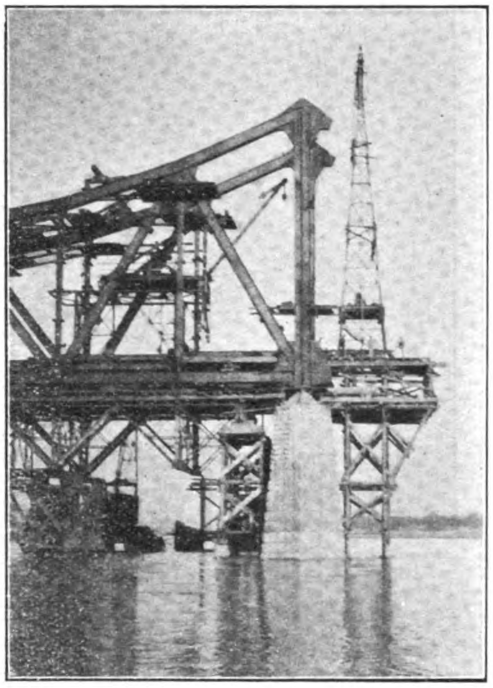
HARBOUR ISLAND

BRIDGE OVER THE YELLOW RIVER ON THE NORTHERN SECTION OF THE TIENTSIN-PUKOW RAILWAY



SKETCH OF THE BRIDGE

This drawing shows the number of piers—looking from the up-stream south side of the bridge towards the north. The second pier is the only one in the stream at normal state of the river.



METHOD OF ERECTION

The crane used in the erection of the cantilever section of the bridge.

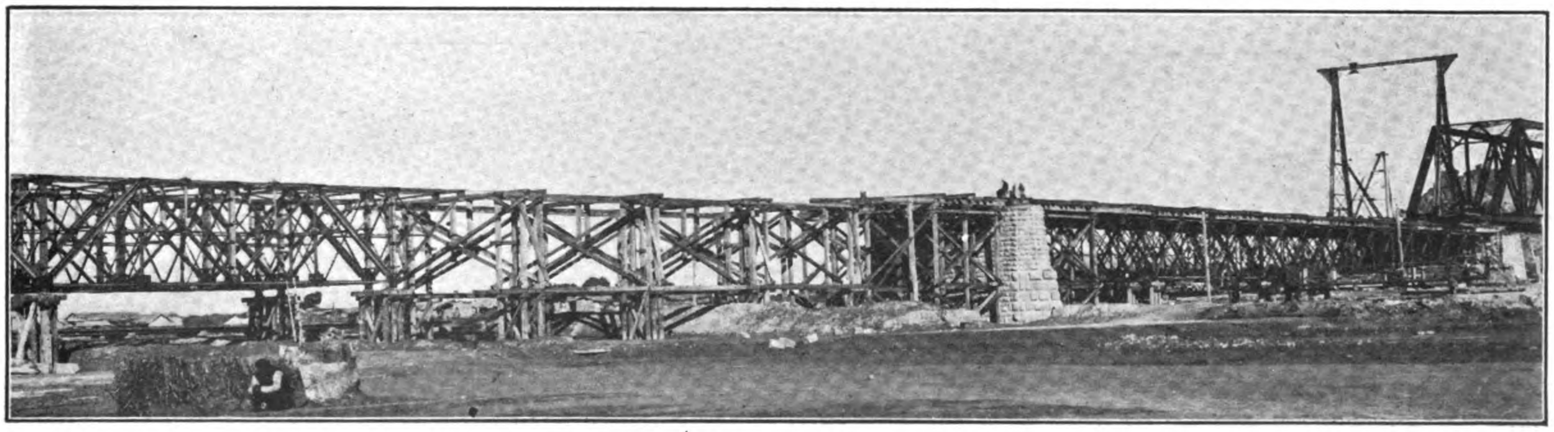
In a very short time the most important railway bridge in China will be completed and handed over to its owners, the Chinese Government. It has been erected over the Yellow River, near Tsinanfu, the Capital of Shantung Province, at a spot some two hundred kilometres from where the river enters the sea, and is designed as portion of the trunk line from Pukow (on the Yangtsze River, opposite Nanking) to Tientsin. The bridge was designed and has been built by the well-known German constructors, Maschinenfabrik Augsburg-Nurnberg, A.—C., Germany, and falls within the northern section of line—that built by German engineers—under Mr. J. Dorpmuller, the Engineer-in-chief.

Work on the bridge was commenced in August, 1909, and the girders joining the central span were linked together on October 9, this section having been projected from the north and south piers without scaffolding.

By December the bridge is expected to be completed and open to traffic. It is 1,255.2 metres (about 4,180 feet) in length, and is built on eleven piers, with abutments at the northern and southern ends. The cost of the bridge is between ten and twelve million marks.

At the bridge site the river has a width at low water of 400 metres, and at high water it resembles a lake, overflowing the northern bank and stretching to the great dyke some 2,200 metres distant. In this region the country is only two or three metres higher than the low water level, whereas there is a difference between the low and high water marks of five metres. Lower down the stream the actual river bed is as much as sixteen feet above the country in some places, great embankments keeping the water to the channel and delivering it to the sea. At the crossing with the Grand Canal, the Canal waters are much below the bed of the giant stream which has so well earned its title of "China's Sorrow," "The Ungovernable," and "The Scourge of the Sons of Han."

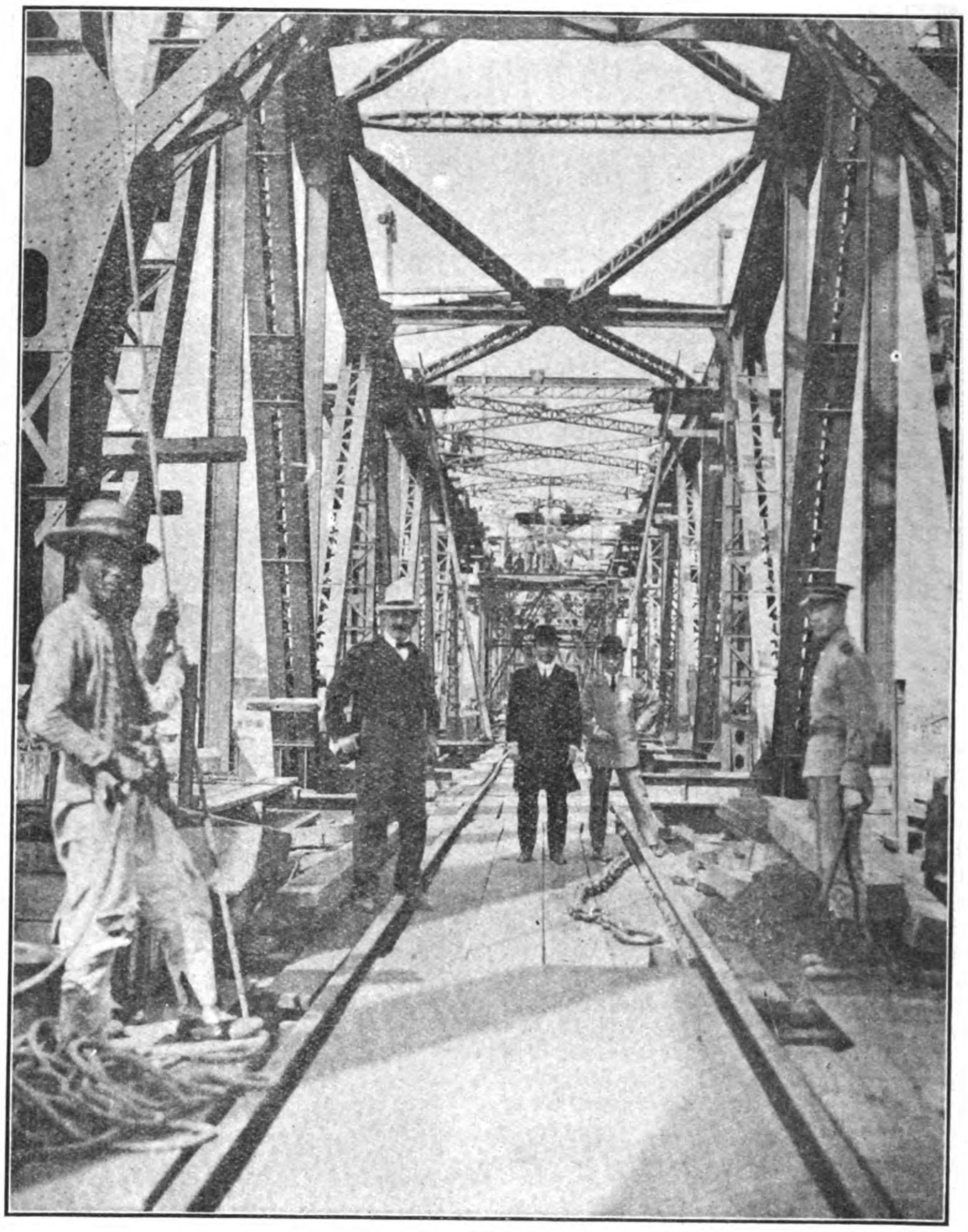
On the south side of the bridge at Tsinanfu the high water embankment is very close to the low water level of the river, only one span being necessary to reach the water. In fact only one pier is in the stream at winter level, the



SCAFFOLDING FOR THE LAND SPANS

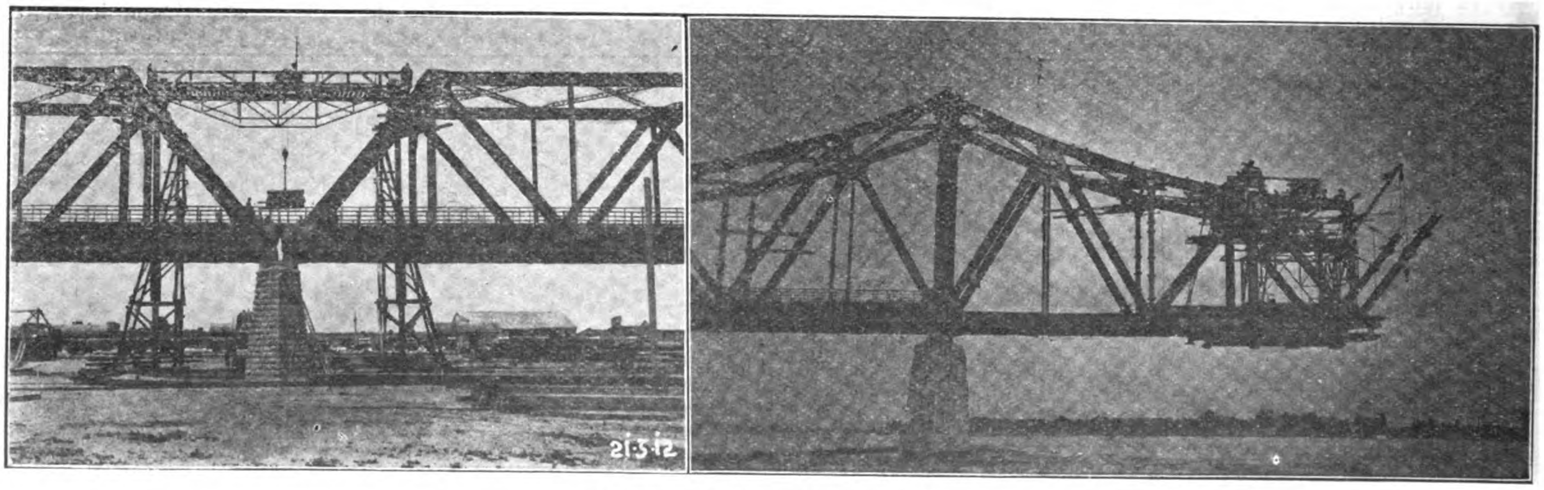
remaining ten being upon the sand flat, one on the south, and the other nine on the northern side.

The velocity of the water at the bridge, as calculated by the engineers, is from four to five metres a second at high water. It varies greatly with the seasons, and another authority gives the discharge at 12,000 cubic metres per second in the middle of the stream at flood time, it being about three times less in normal times. The vagaries of the river are so great and so treache ous that the engineers had to proceed in their calculation for the structure with caution. Their investigations showed them that the bottom of the river to a depth of two metres is constantly moving with the stream; they soon learned that any obstructions to the stream was fraught with danger, and the discovery that violent whirlpools were formed by such prevented them building the central span from scaffolding. In designing the piers, too, they had to consider the possibility of the stream changing its course. It is notorious in history for its meandering propensities. From time to time it has run to the north or south of the Shantung mountains, emptying either into the Gulf of Chihli or the Yellow Sea. It has been in its present course but about 60 years, and adopted it owing to a channel having been prepared by the less important Tsi-ho, or Taching-ho, the original bed of which was discovered during the excavation for the foundations of the piers some 17 metres below the present low water mark of the Yellow River, where was found a very tough packed clay and loess formation impossible of dissolution in running water. The ground above this clay is the deposit of the Yellow River, which carries in suspense enormous quantities of matter brought down from the great loess country in Kansu and other provinces through which it flows, giving the name to the river, and causing it to silt up so rapidly that it can only be restrained from incessant change of course by the erection and maintenance of huge dykes, which, as has been previously mentioned, confines and carries it high above the vast surrounding plains, despite the

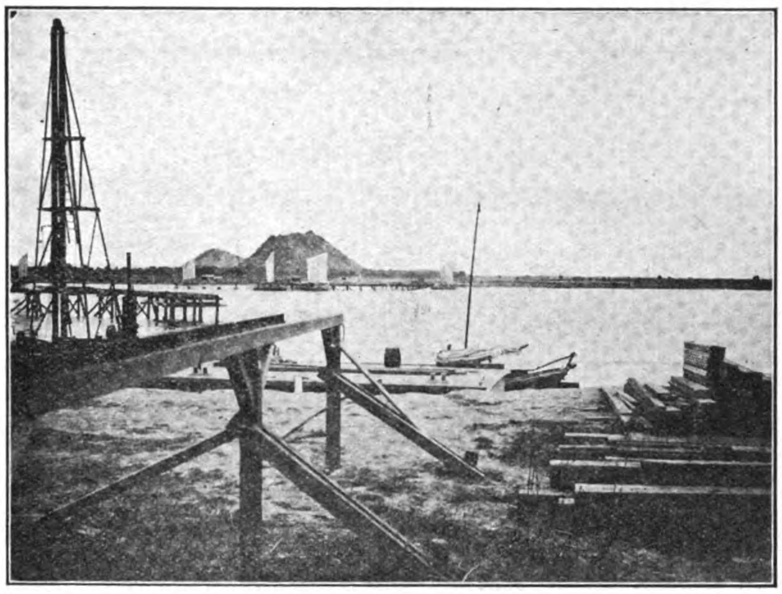


DR. SUN YAT-SEN ON THE BRIDGE

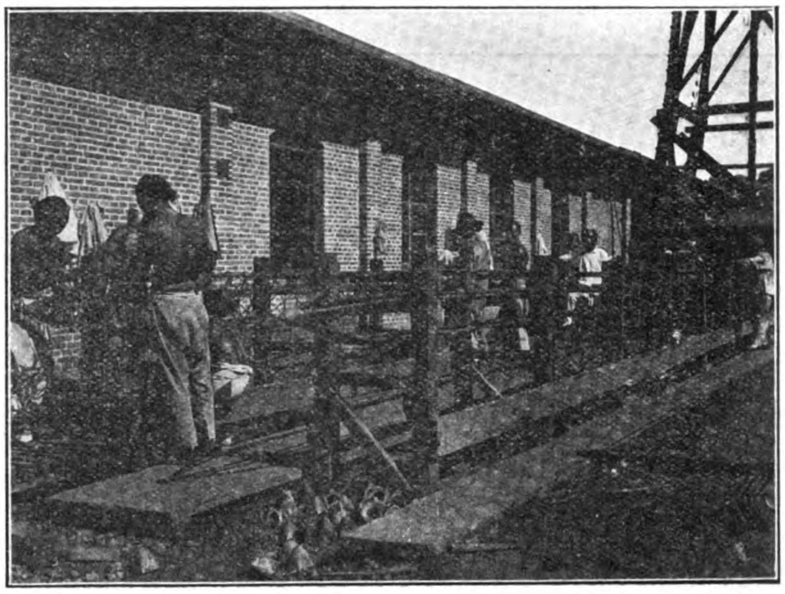
This photograph was specially taken for the FAR EASTERN REVIEW on Sept. 26. Dr. Sun Yat-sen is standing on the centre of the track; on his left is Mr. Chu Kinhow, the Associate Director of the northern section of the Tientsin-Pukow Line, whilst on the rail in the foreground is Mr. Karl Preiss, Resident Engineer of the Bridge.



SHOWING THE METHOD OF ERECTION



IN THE EARLY STAGE
Looking towards the north bank of the river



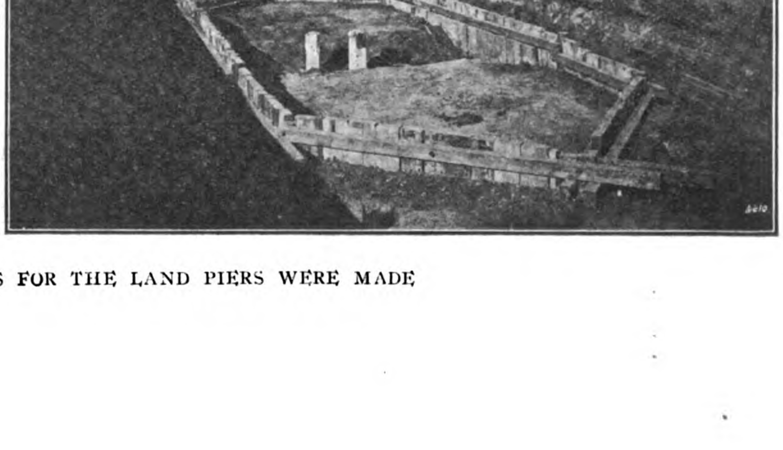
MAKING REINFORCEMENTS FOR PILES

tremendous volume of water constantly flowing. The changeableness of the stream necessitated great attention being given to the pier foundations, and consequently they were sunk so deep that undermining by water is now a practical impossibility. The engineers have prepared for exceptional deviations and depths and even if changes occur, the extent of which might not now be foreseen, it is calculated that the bridge will not be affected.

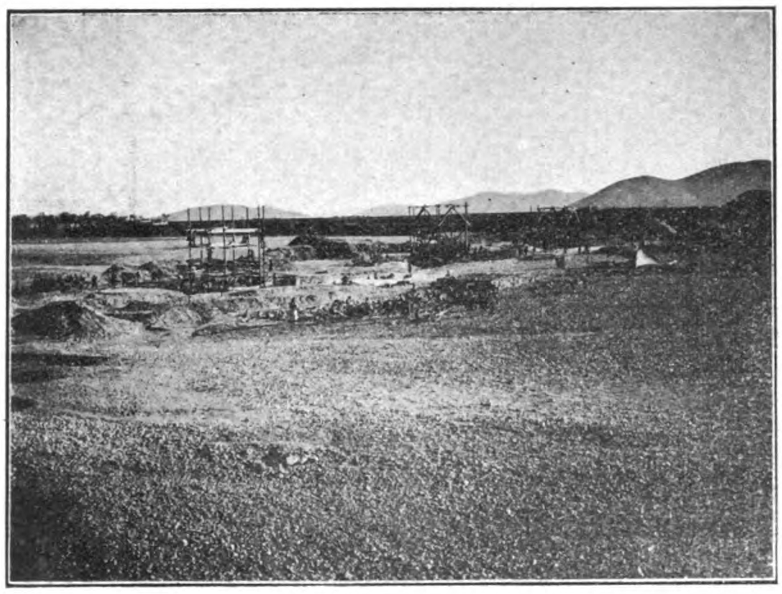
In forming the foundations of the piers, except the one now in the middle of the stream, steel reinforced quinquangular concrete piles, having a superficial sectional measurement of 0.123 square metres, a length of from 15 to 17 metres, and tested to carry a load of 150 tons each, were driven, 176 being beneath the first pier on the southern side, 240 beneath the third (the second pier is without piles), 176 beneath the fourth, and from 106 to 90 beneath the balance. So many piles have been driven in fact that it is calculated that even should the earth be washed away from the concrete foundations of the piers the piles alone would carry the bridge with thorough safety to traffic. To prevent the action of the water affecting the foundations, however, aprons of stone, with piles, have been built round each pier, that guarding the pier in the centre of the stream having a length, inclusive of the pier, of 92 metres, and a width of 34 metres.

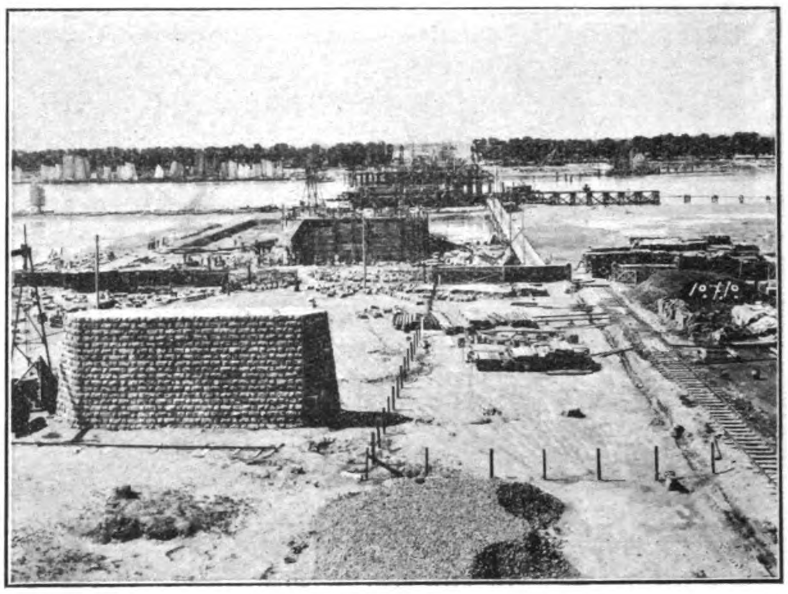
The two side abutments and the land piers, which are only touched by exceptionally high water with very little velocity, and in ordinary times are on high and dry land, have been erected on reinforced concrete piles 15 metres long. The base of the foundation of each pier is from six to seven metres below the level of the ground, and the points of the piles (which are iron sheathed) are some 13 metres below the base of the foundations, the heads of the piles being embedded in the concrete foundations about two metres. Excavations were made and timbered to enable the foundations of these piers to be constructed, and in this connection work was fairly simple. The pier in the river, and those in the immediate vicinity liable to be exposed to violent attack from the stream, were, however, more difficult. They were built to resist any onslaught, the engineers, in accordance with experience gained of the country in the course of their work and conclusions arrived at by observation, deciding to sink the foundations 17 metres under low water level. Reinforced concrete piles, 17 metres long, were driven a depth of from eight to eleven metres, and upon these was built a rammed concrete foundation.

This work was carried out with the aid of steel caissons, which were at first sunk a depth of 13 metres below low water level, so that caissions 14 metres

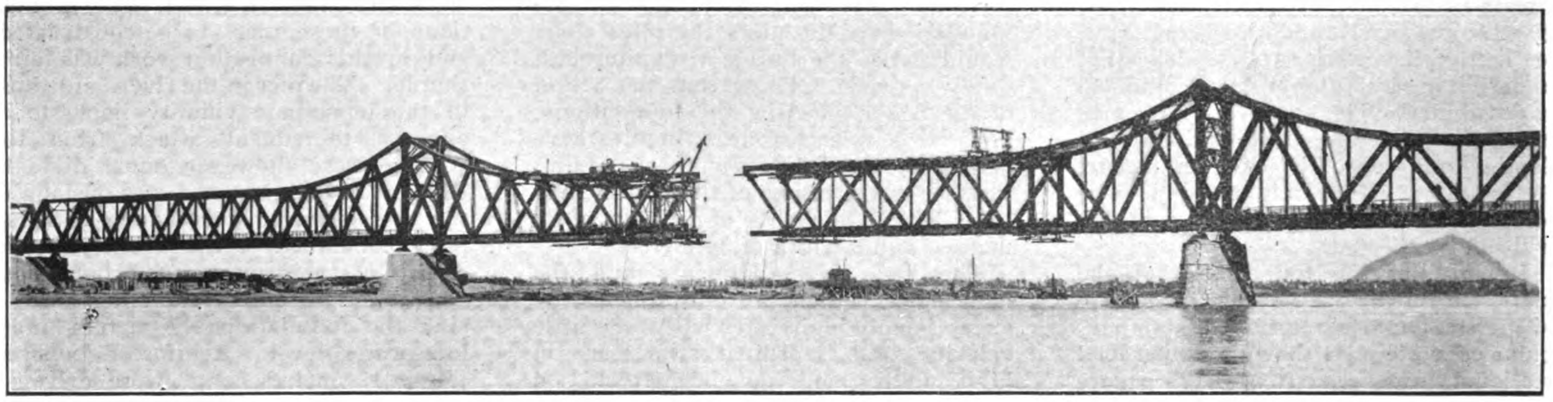


METHOD IN WHICH THE FOUNDATIONS FOR THE LAND PIERS WERE MADE



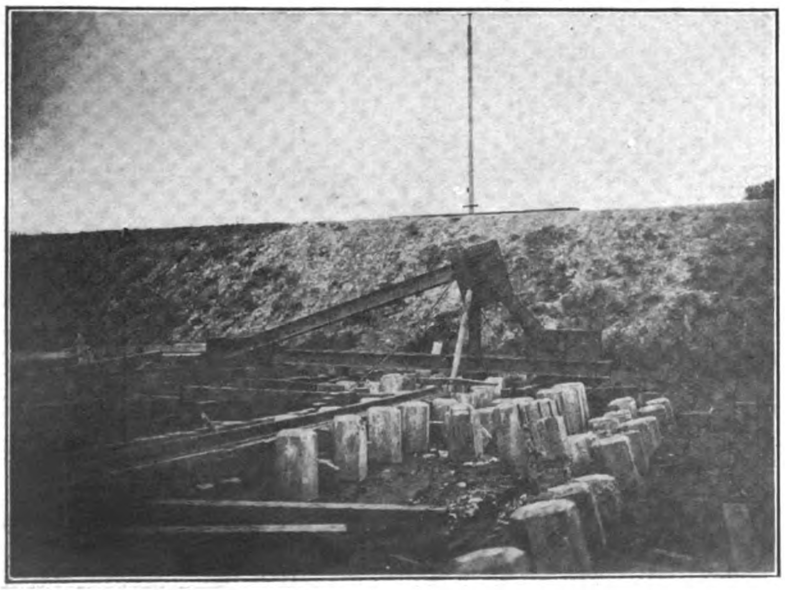


WORK ON THE ERECTION OF THE PIERS

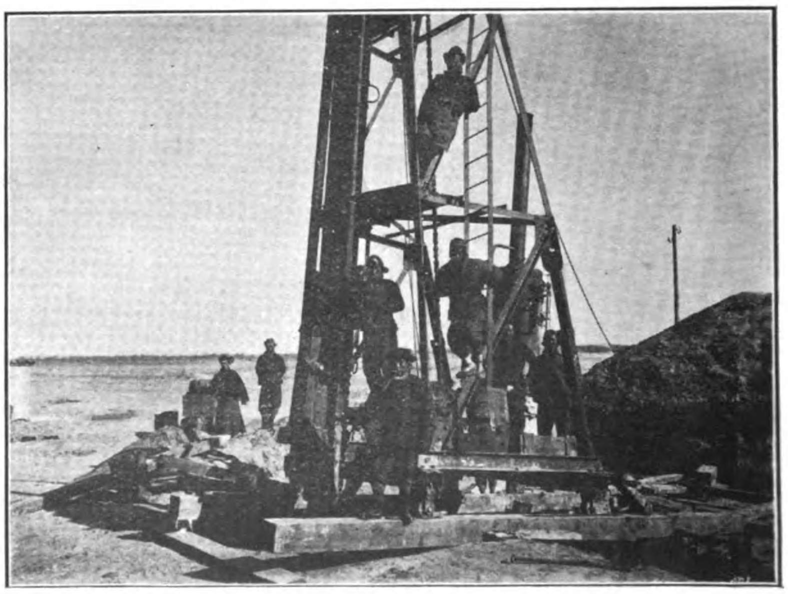


CONSTRUCTION OF THE CANTILEVER SECTION

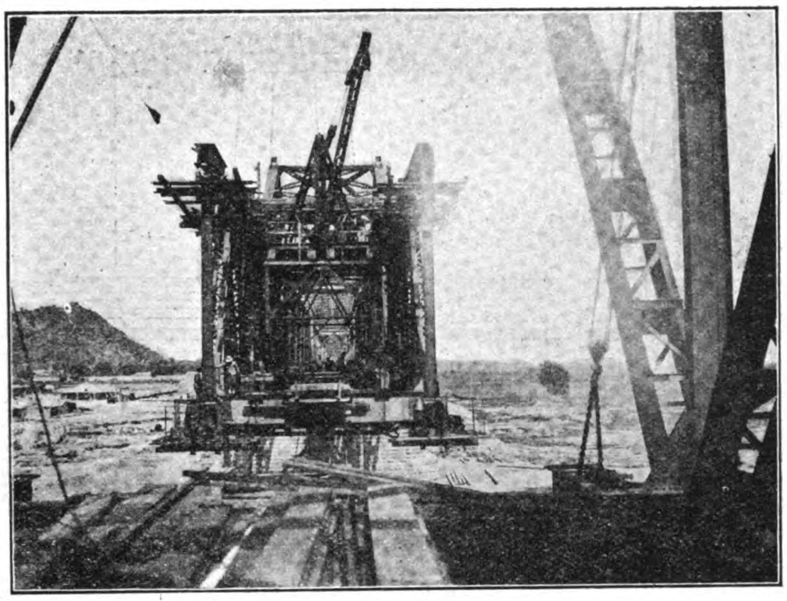
Photograph of the bridge specially taken early in October, looking from the south bank, upstream



REINFORCED CONTRETE PILING

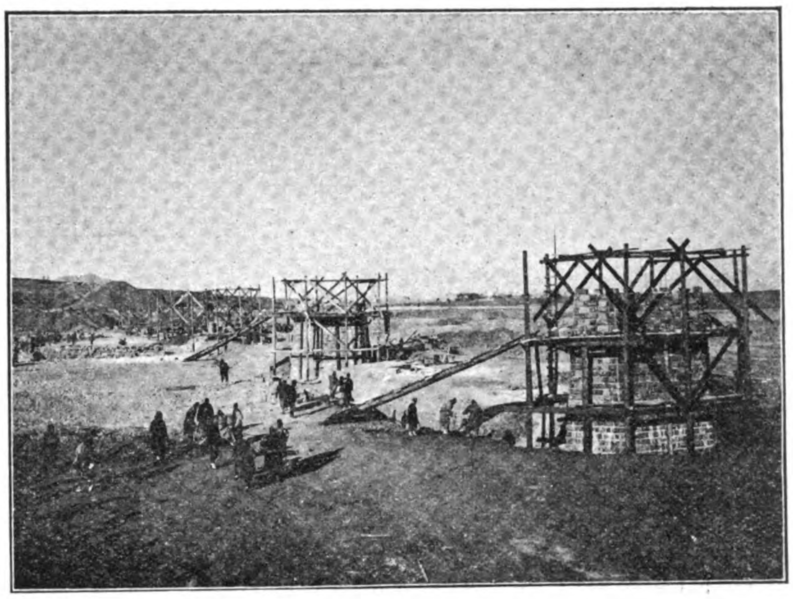


THE PILE DRIVER



BUILDING THE CANTILEVER SECTION

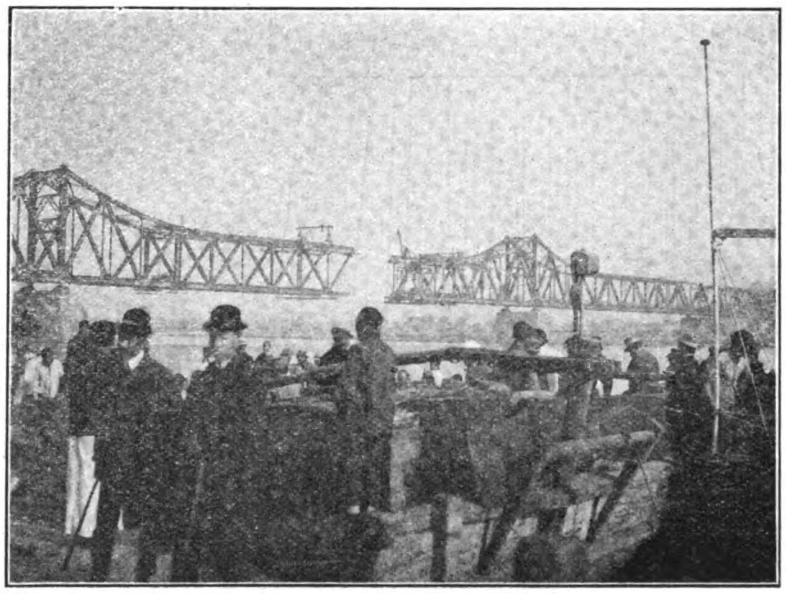
Photograph specially taken on Sept. 26 from the south side of the central span of the cantilever section



WORK ON THE LAND PIERS

high were just a little above water level. On top of the caisson a steam pile driver was erected, the ram of which had a weight of four and a half tons. With this the piles were driven, though the work was tedious and slow, the resistance of the tough loess and the increasing compression of the ground by the addition of pile after pile preventing the pile sinking but by millimetres at each stroke. After driving the piles the earth between them was removed and the caisson was sunk a further four metres, a mantle of concrete being put in. The first, third and fourth piers, counting from the south side, were built in this manner, but the second. pier—which is in the stream—was constructed differently. It is the largest pier under the bridge, the foundations having a superficial measurement of 270 square metres. Piling was abandoned in favor of solid foundations, which were sunk 25 metres below low water level, five metres being in the water, and twenty in the ground beneath the river. The steel caisson and compressed air (which was also used in the building of the foundations of the three piers just referred to) were utilised. The atmospheric pressure inside the caisson varied with the height of the surrounding water, occasionally reaching 35 lbs. to the square inch; the labourers then found work difficult, and were compelled to adopt shorter shifts.

During the construction of this pier the Yellow River showed itself in all its viciousness. It rose to the greatest height experienced by the engineers just at the moment when the frame was ready for the hanging up and sinking of the caisson; later on, just when the work on the pier was about to start, it brought down an exceptional ice drift, which ended with just as exceptional a frost, the whole river being frozen from bank to bank, enabling pedestrian and cart traffic to be carried on its surface for six weeks. However, these and other unexpected tricks of the river did not find the engineers unprepared. Safeguards which had been planned from the beginning stood every test, and flood and ice drift passed without doing any harm to the work in progress.



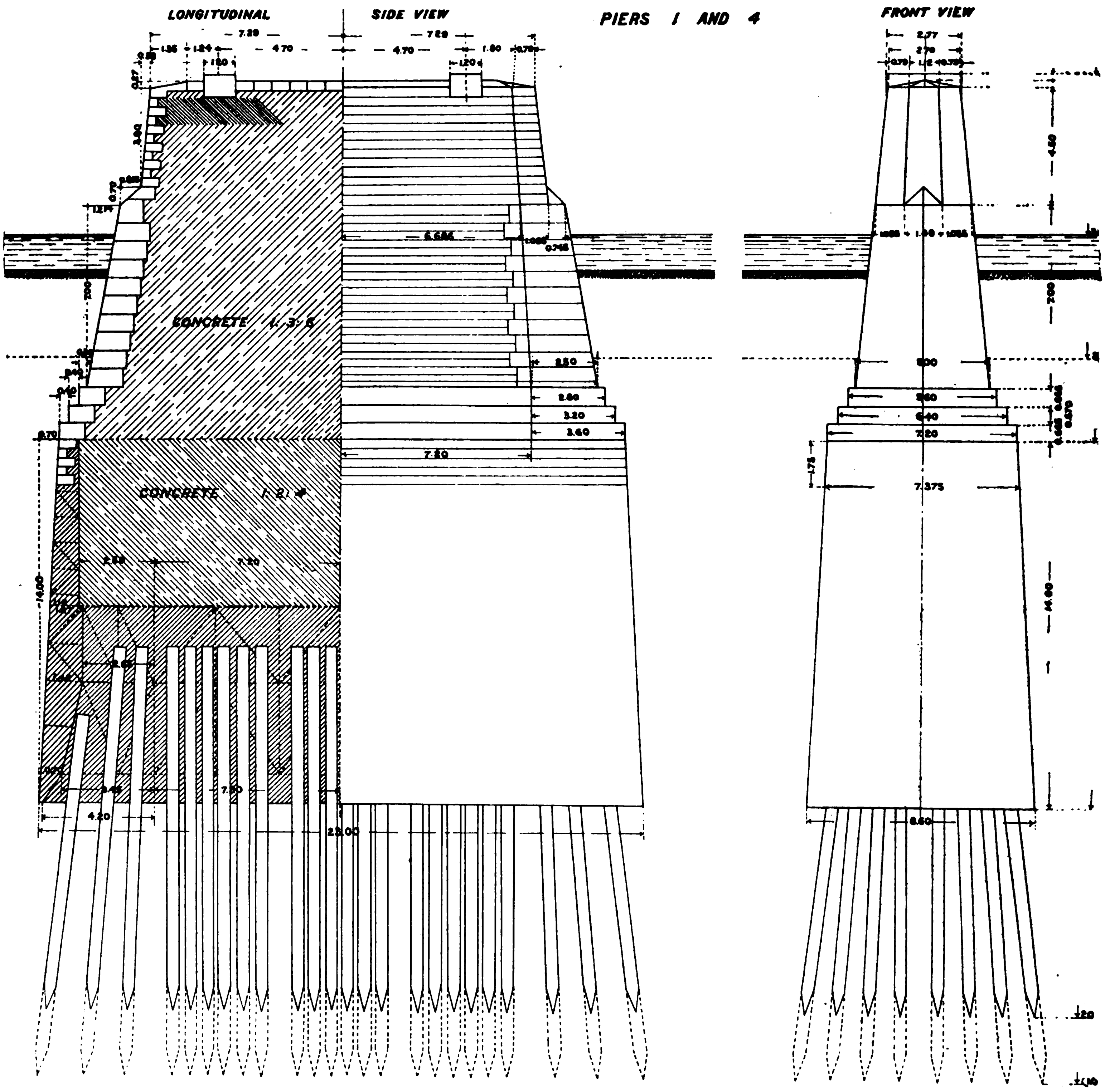
TRANSPORTATION OF PASSENGERS

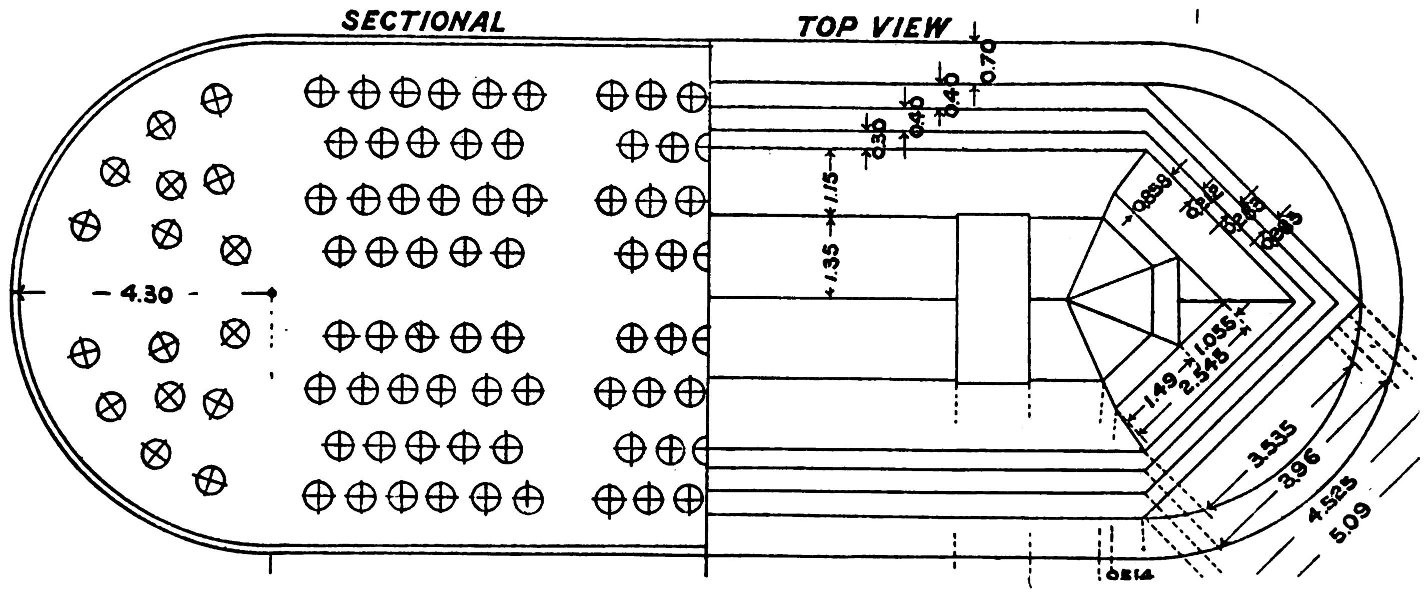
Pending the completion of the bridge passengers were transported across the river on barges. In the foreground stand Mr. Chu Kinhow, Associate Director of the Line, (on the right), and Mr. Wu Ying-fo, Chief Deputy of the Chinese Government Railways, (on the left)

As has been indicated use was made to a considerable extent in the foundations of rammed concrete, and the piers were built of the same material, faced with limestone and granite, the bedstones for the steel-work superstructure likewise being of granite. During the work of building the piers Chinese up to the number of 1,500 were employed, but the number was reduced during the erection of the steel work to between three and four nundred.

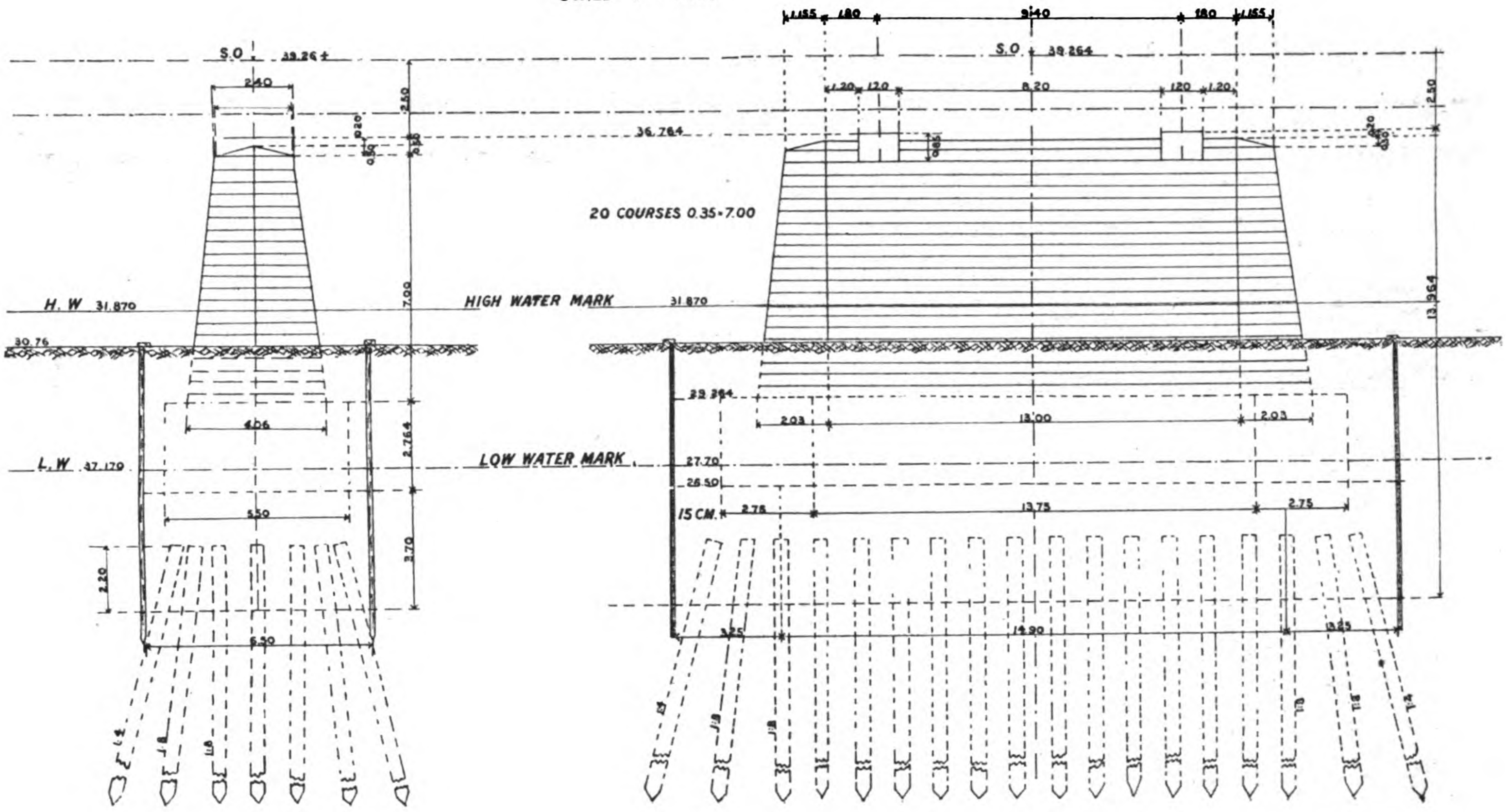
The contract for the steel work was divided with two other German bridge engineering works, and altogether 8,700 tons of girders and beams were used, whilst over 200 tons of rivets were driven at the site, pneumatic rivetting machines being used in this work.

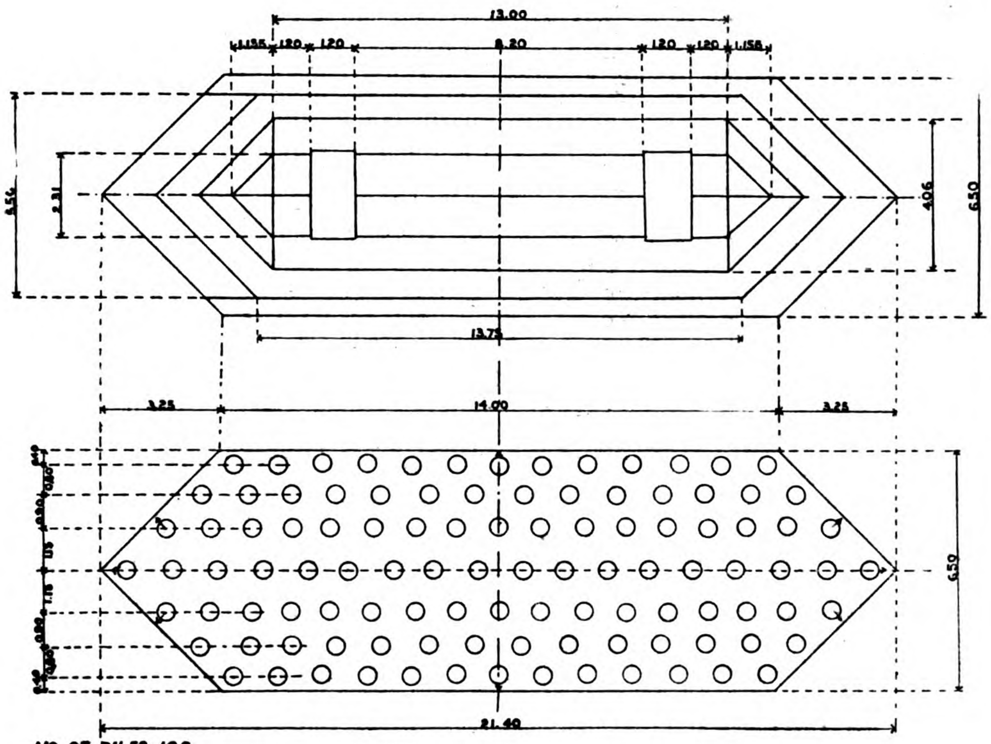
As mentioned above the total length between the south and north abutments is 1,255.2 metres, or 4,180 feet, and consists of the river bridge proper, of three spans—the two side spans being 128.1 metres (about 427 feet) and a central span 164.7 metres (about 557 feet)—and nine land spans 91.5 metres (about 305 feet) each. Of the latter one is situated on the south bank and the remainder on the north. As the sketch indicates the bridge consists of twelve spans of mild steel "through" lattice girders, the land spans taking the form of Pratt trusses, whilst the three central spans over the waterway are a combination of cantilever and Pratt truss, the latter in the central span having a length of 109.8 metres (about 366 feet).


LONGITUDINAL
SIDE VIEW
PIERS I AND 4
FRONT VIEW
CONCRETE 1:3:6
CONCRETE 1:2:4
7.20
7.375
14.00
4.20
23.00
6.50


SECTIONAL
TOP VIEW
4.30
1.35
1.15
0.70
0.40
0.30
1.49
1.055
2.545
3.535
3.96
4.525
5.09

PIER No. 6
SCALE 1 - 100.





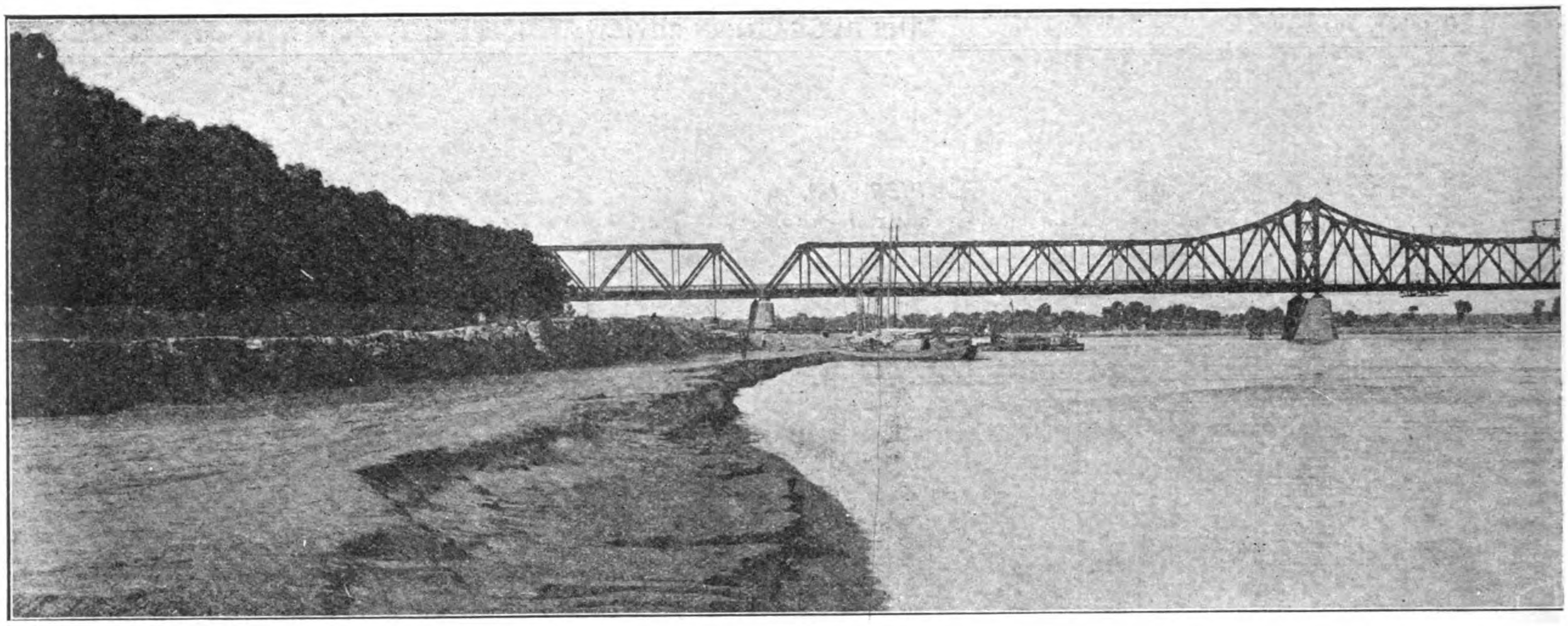
NO. OF PILES. 106

Pier Foundation Plans

of the

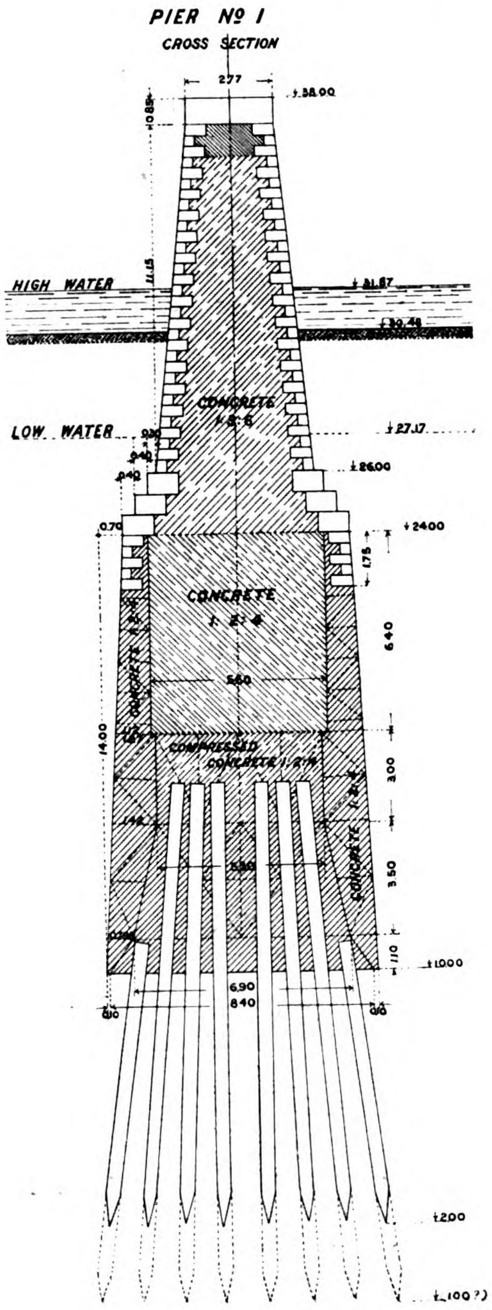
Yellow River Bridge

Tientsin-Pukow Railway Northern Section



PHOTOGRAPH OF THE

This photograph was specially taken after the junction of the cantilever section and is a view of the bridge from the down-stream south



The track of the centre span is absolutely horizontal, the rail level being 13.5 metres (about 45 feet) above low water level. The land spans on each side for the three main spans fall towards the abutments at a gradient of one in 150 metres.

The designing of the steel superstructure presented a few uncommon difficulties. The engineers were called upon to complete a single track bridge which could be converted with a minimum of cost into a double track one. Therefore the minimum width between the main trusses was fixed at 9.4 metres (about 31 ft. 4 in.), the cross girders were constructed to carry a double track, and whilst the main span was built only sufficiently strong for a single track it has been so arranged that in the event of traffic increasing justifying a doubling of the line the main girders may easily be reinforced without the necessity of interrupting traffic other than to lay the two sets of rails, the reinforcement being the erection of extra girders outside and attached to the existing ones. But many years are liable to elapse before a double track will be called for. The gauge of the line is, of course, the standard one of 1.435 metres (4ft. 8½ in.) and the present track is laid along the centre of the bridge, on both sides being a passage way for pedestrians each 1.75 metres wide. In the event of a duplication of the track these would be removed to the outside of the superstructure, and be carried on steel brackets.

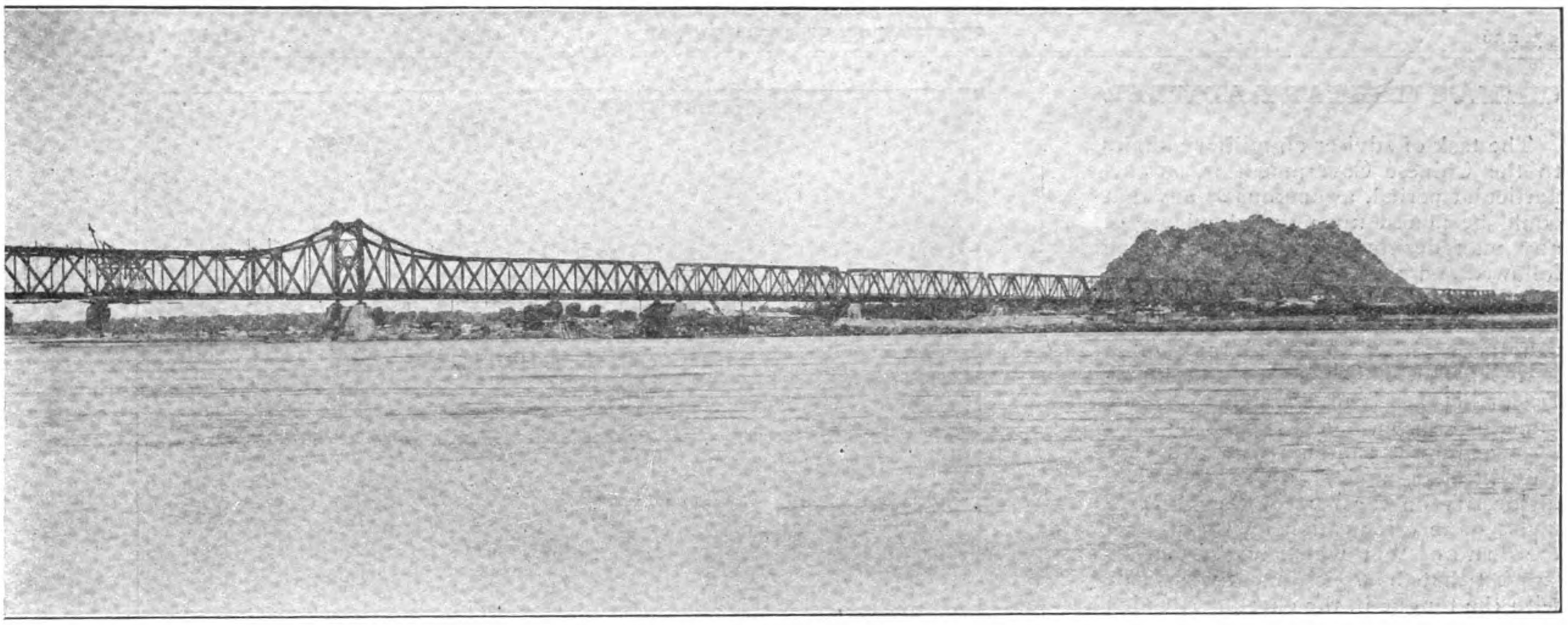
For the calculation of the steel structure the scheme of loads was as follows: The train load on which the calculations for the design were based consists of four locomotives coupled followed by a train weighing 5 tons per metre run (roughly two tons per foot run). The dimensions and weights of the locomotives are as follow: Two leading locomotives 17 metres in length (55 ft. 9 in.) weight 138 tons, greatest axle load 16.3 tons; two following locomotives 18.6 metres in length (60 ft.), weight 149 tons, greatest axle load 20.3 tons.

The erection the land spans, as well as the two side spans of the cantilever section was carried out with the aid of fixed falsework, whilst the central span over the waterway was built out from the south and northern sides without scaffolding. The latter method was adopted owing to the swiftness of the current rendering scaffolding impossible.

Electric cranes were employed throughout the work, and in the handling of the steel-work the European engineers (of whom there were originally fifteen, but in the latter stages only seven) found the Chinese particularly skilful, and their work was at all times satisfactory. The Resident Bridge Engineer is Mr. Karl Preiss, who was born in Mintz, Germany. He commenced his engineering training in 1887 with the firm he now represents, the designers and builders of the bridge. The assistant Engineer is Mr. H. Pluckham.

It is interesting to note that the builders recently were successful in the competition for designs for a bridge over Sydney Harbour, as well as for a bridge at Calcutta, the latter being a steel swing bridge on pontoons. They have also constructed bridges in Africa and South America, though this one across the Yellow River is the largest they have so far built.

Only a few weeks stand between the present stage and completion of this work, which can rank among the foremost bridges of the world, and the best reward for the engineers and those who have helped in the construction is the recognition of their fellow engineers.



COMPLETED BRIDGE

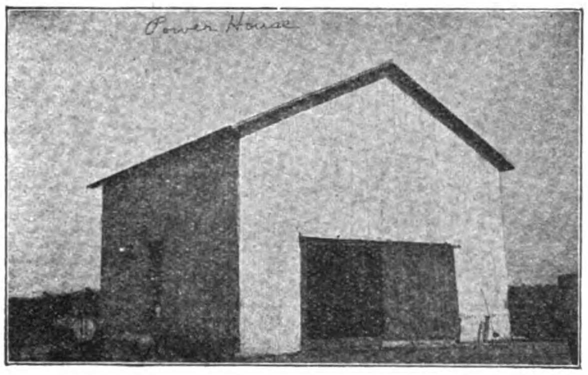
bank, looking towards the north. It splendidly illustrates the imposing structure, and shows clearly the limits of the stream at low water

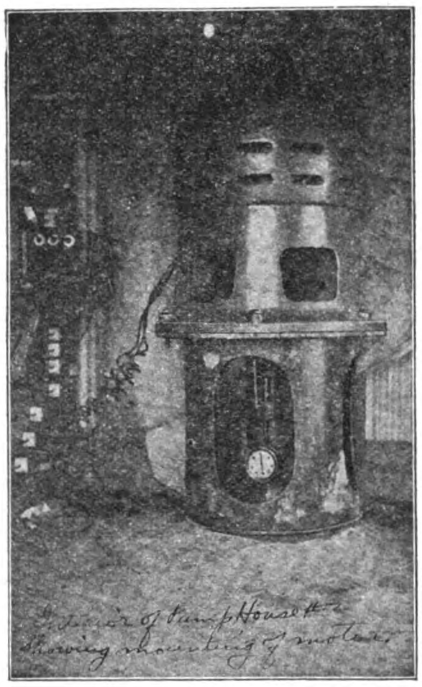
HIGH VOLTAGE ELECTRIC EQUIPMENT ON THE PLANTATION

BY J. F. AHERN

One of the installations which illustrates how closely the planter and farmer keeps in touch with, and turns to his profit, the use of modern machinery, is a pumping outfit operating on the 1,700 acre rice plantation of Floyd Williams, Ellis, La., near Crowley.

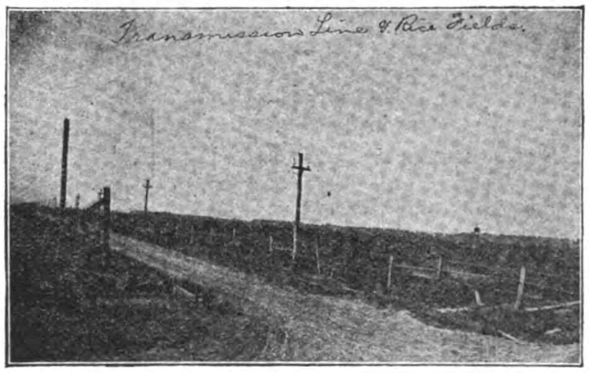
The prime-mover is a Fairbanks-Morse 200 H.P. Four Cylinder, Four cycle, Quick Start, Slow Speed Oil Engine running on low grade oils, direct connected on same cast iron base to Fairbanks-Morse 170 K. V. A., 2,300 Volt, 3 phase, 60 Cycle Alternator, with Exciter and Switch-board.



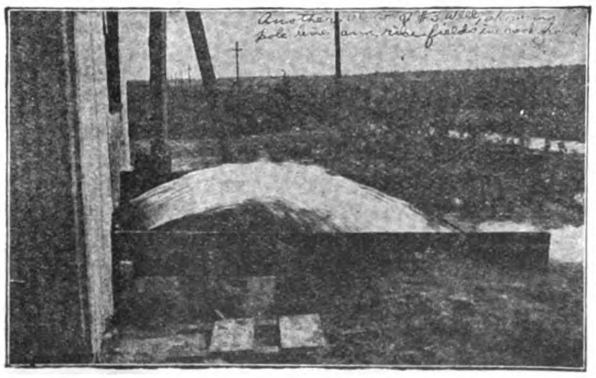


The generating set provides current for operating three 75 H.P. Fairbanks-Morse Vertical Squirrel Cage 2,200 Volt Motors direct connected to Vertical Centrifugal Pumps. One Pump is located at the power house, the second three quarters of a mile away, and the third a half mile further, or one and one quarter miles from the power house.

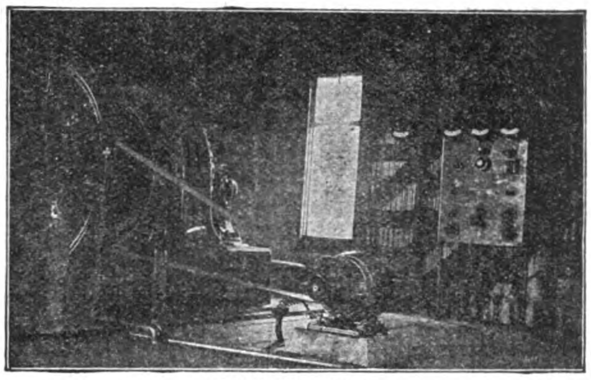
The current is transmitted over private pole line on Mr. Williams property at 2,300 Volts without transformers, excepting a small transformer at each pump house which provides 110 volt circuits for lighting the pump houses.



Each motor is connected by coupling to centrifugal pumps throwing 10 in. streams. The water stands in the wells from 40 to 60 ft. below the surface, each pump discharging from 3,000 to 4,000 gallons of water per minute. Each well supplies about 250 acres. The illustrations herewith show the generating unit, power house, transmission line, pumps and pump houses. The equipment was sold and installed by Fairbanks, Morse & Co., No. 608 Magazine St., New Orleans, La., and the installation has proven eminently successful in every way, Low grade oils from Louisiana and Texas Refineries operate the engine, and the economy shown has been considerably better than the manufacturer's claims.



Provisions were made so that additional generating units, as well as motors and pumps can be added in future if wanted, without materially adding to the cost of attendance. The electrically driven pumps replaced steam driven outfits, which required at least one attendant at each pump. The present arrangement allows for locating the wells and pumps at the most convenient point for the rice fields flooded regardless of such conditions as good roads or easy access for coal transportation, etc.



SWITCH BOARD

The electrically driven pump fits into the rice irrigating problem very nicely, as a well that is pumped 65 to 75 twenty-four hour days per season has considerable sand and sediment drawn from it, and in a few years the pump and column sink and get out of line. A belted vertical pump is hard to keep in line under these conditions as the belt will not stay on when out of line while the electrically driven vertical pump with motor mounted on the frame overcomes this difficulty.

When a well ceases delivering water, a new one can be sunk nearby, and the pump and motor easily moved without having to move an engine, boiler and smokestack. Furthermore the operating of the pumps can be manipulated to suit the water supply, that is one pump can be stopped in one field and another started in another field, without additional prime mover capacity.

CHINA'S MILITARY ADVISER

COMMANDANT BRISSAUD-DESMAILLET

The task of adviser on military affairs to the Chinese Government is, at this particular period, as onerous as any that could be placed upon the shoulders of any man desirous of seeing his advice followed and anxious to see the service he specialises in placed upon a business-like footing, efficient and worthy of a country aspiring to the dignity of a first-class power. Commandant Brissaud-Desmaillet has been honored with the difficult position, and if reputation goes for anything he is a man who will very quickly chafe under any exhibition of insincerity on the part of the Government, or any indication on the part of the Board of War which might tend to suggest that the appointment was made with the tongue in the cheek. If China needs advice in any department just at present it is in the department of War, and that significant fact Commandant Desmaillet well knows.

It would be idle, it would be futile, it would be folly to endeavor to gloss over the difficulties which stand in the way of reform in the army. The Revolution from which the country has just emerged has left the army in a state bordering upon chaos. It is split into factions, is controlled not by one but by many, is preening itself as being the arbiter of the country's destinies. It holds the country's rulers in the hollow of its hand, challenges the National and the Provincial Assemblies, and domineers over the Tutus (Governors-General) if any one of that grade does any act or suggests any move that might in any way infringe upon what the army prescribes as its special domain—and its domain extends into politics. The Revolution has left it powerful and peccable. Divided yet composite; internally torn by the jealous rights and privileges of individual cliques and coteries, yet ready to spring together upon the common foe who would trespass upon the ground over which it presumes to have and to hold the arbiter dicta. Its ranks are aflood with generals who are not generals, its files are crammed with a riff-raff dangerous in its ignorance of the *raison d'etre* of a soldier, menacing in its disregard of the fundamental needs of discipline. Particularly is this so in what is called "the South." The military organisation there is military disorganisation. The pseudo-soldiers are held in apparent quiet simply because they feel disposed to remain quiet, bribed by promises, or under the fear of the sword. No one dare say to-day that the army must do this or that, and insist upon the order being obeyed, and he will be a brave man who will endeavour at this period to take decided action to bring the scattered forces under one supreme head. For this reason Commandant Desmaillet has a thankless work ahead of him, a task in which he will need to have the constant service of all the tact of which he has the advantage, and all the knowledge of the Cninese of which he is credited with being possessed. His is the least attractive of the posts on the Advisery list if he hopes to accomplish something immediate and tangible. If he does not, and it is certain that such is not the case, it will be a sinecure.

Though Commandant Desmaillet carries to his appointment a fund of valuable knowledge, his selection hinges upon the personal liking felt for him by President Yuan Shih-k'ai. During the period in which Yuan Shih-k'ai was in retirement in Honan he was frequently visited by the Commandant and he learnt to appreciate the manly qualities of the French officer. So much so is this the case that when other nationals endeavored to cause the rejection of the appointment upon its announcement the only reply vouchsafed their suggestions by the President was "Major Desmaillet is a lao-peng-yu,"—an old trusted friend. But whilst friendship had much to do with the appointment it is still a good one. The Commandant's duties in the service of France enabled him to acquire a valuable knowledge of European armies, and his publication on the tactical ideas of Germany and France between 1894 and 1911 is described as being of high merit and exceptional worth. In China he has travelled extensively, and knowing the conditions of the country and the character of the people he is able to apply his wider knowledge of the outer world to local problems. He has made a careful study of the various military systems of the world, and has evolved a most elaborate system of reform for China, a system which may be said to embrace the best features of the military organisation of various nations, with vigilant regard for the conditions peculiar to China and her people. The basis of his reform will be the retention of China's modern style troops, which he proposes to use as a nucleus, and the abolition of the old-style regiments.

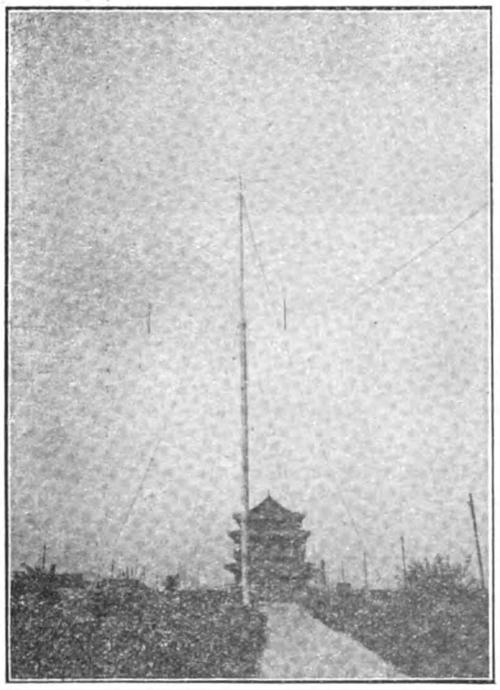
Commandant Desmaillet was born at Carassonne, in the south of France, on January 16, 1869, and entered the military College at St. Cyr at the age of 18. Two years latter he secured his commission as sub-lieutenant. He was attached to

the 14th battalion of Alpine Infantry, and being sent to Austria distinguished himself by making valuable investigations into the organisation of military affairs in that country. Whilst in Austria he followed his practical studies and made a thorough study of the archives of the Ministry of War in Vienna, where he was received and assisted by the highest officers in the Austrian army. In March 1897, he was raised to a captaincy, and placed in command of a Company in the 28th battalion of the Alpine Infantry. Eventually he went as special Adjutant to the staff of the Minister of War at Paris, and was placed in charge of the German and Austro-Hungarian departments at the war office. In June 1903, he was sent to Peking as Military Attaché, which post he held until 1910, when he was recalled to France. He was attached to the 5th Regiment of Infantry and later appointed special A.D.C. to the Minister of War, M. Messimy. Ultimately he was depatched to Tientsin in command of a battalion of the 16th Colonial Regiment, and on August 16 last was appointed Military Adviser to China for a period of three years. The Commandant is held in high esteem by his friends, and nations such as Austria, Spain, Italy, Japan, Korea and China have signified their appreciation by conferring decorations upon him. In addition he was created a Chevalier of the Legion of Honour of France.

FAR EASTERN WIRELESS INSTALLATIONS

American Installation at Peking

The latest addition to wireless telegraphic installations in China is that which has just been erected for the American Legation at Peking. The mast has been placed upon the historic wall at the rear of the Legation and to the east of the famous Chien Men. The accompanying illustration shows the Gate in the background.

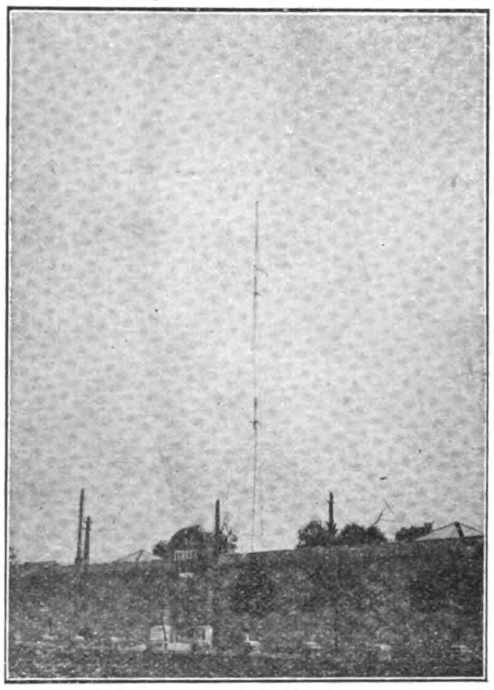


AMERICAN WIRELESS INSTALLATION ON THE PEKING WALL

The Fessenden system has been utilised (a navy plant having been installed) and the power is generated in the Legation compound. Shanghai is well within the ordinary working radius.

The mast is a single pole 129 feet in height, and, as the wall is 39 feet high, the truck is thus 168 feet above the level of the street. The piece of timber came from a Yalu River forest and is one of the longest poles that has ever been seen in the capital. The whole installation was effected by Navy Electrician J. W. Keever.

There are two other wireless installations in Peking, one being in the Italian Legation compound, and the other in the city, the latter belonging to the Chinese Government. The former is a 1900 type Marconi plant of one kilowat power, with a range as far as Tongku.



ITALIAN WIRELESS STATION IN LEGATION COMPOUND, PEKING

The mast (shown in the accompanying illustration) is 150 feet high. The Chinese Government station was erected by and equipped with the Telefunken Company's apparatus and is of five kilowat power. It was built to work with an identical station at Nanking, but as that was destroyed by General Chang Chun during the siege of Nanking in the recent Revolution, the Peking station is now closed for lack of a corresponding installation with which to operate. The plant has a radius of action at all times and under any conditions of 600 miles, but under favorable circumstances can communicate 2,000 miles. The masts are 200 feet high.

Hongkong and Wireless

At a recent meeting of the Legislative Council at Hongkong a formal protest was made against the postponement by the Imperial Government of the erection of a wireless station. Mr. H. E. Pollock, in bringing the matter up for consideration contended, that instead of delaying the establishment of a station the Imperial Government should hasten it in view of the part that statistics proved Hongkong to be the largest shipping port in the world. He considered the station should be completed simultaneously with the one at Singapore and in order to give emphasis to the feeling of the community he moved "That this Council has read with pleasure the statement of the Postmaster-General, made in the House of Commons, on the 7th of August, 1912, to the effect that it is the intention of the British Government to erect, at its own cost, a £60,000 Wireless Telegraph Station in Hongkong and that such Station is to be used for the transmission of commercial cables, but that the Council regrets to learn from the statement that the erection of such a Station is to be postponed till a later date, and that this Council begs to most respectfully urge upon the British Government the desirability of such a Station being erected in Hongkong at the same time as the Singapore Station." Mr. C. H. Ross seconded the motion and made it plain that lack of enterprise was not due to the commercial community. As however, they were already lagging behind Japan, the Philippines and even parts of the neighbouring Republic of China, and were entirely dependent in the matter of wireless communication on the good offices of His Majesty's ships when they happened to be in port, he thought the Council should strongly urge that the provision of the station should be no longer delayed.

The Governor (Sir Francis May) said that the Government had no information about the scheme, and all he could do would be to ask the Imperial Government for information and forward the resolution, together with the speeches of hon. members, and to say that they were very desirous that Hongkong should not be left out of the scheme. The Government could not accept the resolution, he explained, and it was later withdrawn.

At the same meeting in the Governor's review of the Budget, mention was made of the fact that a sum of $100,000 had been provided for a radio-telegraphic installation. As at present advised, the Government considered that all that was necessary was a station for ship to shore communication with a range of not less than 600 miles under favorable conditions.

His Excellency said he knew that a much more powerful station had been suggested. But he would remind the Council that a high power station for strategic purposes was the concern of His Majesty's Government; that a medium power station for purposes of communication with land stations in competition with the Cable Companies was really a separate proposal; and that what the Port really required was the means of ship to shore communications. As ships carry only installations of limited range, it did not seem necessary to do more than to provide at station capable of ensuring communication with ships, making due allowance for possible increase in range of the latter's installations. He had asked the Secretary of State for advice as to what, in these circumstances the nature of the installation in Hongkong should be, and he would inform the Council in due course of the result.

German Steamer Installations

The North-German Lloyd of Bremen announces an important extension of the wireless news service to their steamers on the Far Eastern lines, says the *North-China Daily News*. Up to now it has only been possible for these to receive important news on the western side of Port Said, as the power of the wireless station in Germany only reached to that distance, and for any further news the vessels could only depend on other ships. Now, however, that the necessary wireless apparatus has been erected in Tsingtao, the direction of the *Ostasiatische Lloyd*, a Shanghai journal, the North-German Lloyd and the Deutschen Betriebsgesellschaft für Drahtlose Telegraphie, have come to an arrangement with the Government in Tsingtao by which telegrams will be despatched to the German company's ships twice daily, namely, at 2.30 and 11 p.m. (Chinese coastal time). The wireless telegrams will immediately, on receipt, be posted up in the vessels for the information of passengers.

Suragoa Gold Fields.—Mr. E. O. Parker, who is looking after the interests of the Suragoa Gold Mining Co. is sanguine of the success of the venture. The sluicing equipment at the mine has more than justified the investment. A large hydraulic plant has been ordered from the States.

THE PHILIPPINE GENERAL HOSPITAL

In the year 1900, prior to the establishment of the Civil Government in the Philippine Islands, and shortly after the arrival on the ground of the Second Philippine Commission, commonly known as the "Taft Commission," Dean C. Worcester, who was then a member of the Commission and who had held the position of Secretary of the Interior since the establishment of the Executive Departments of the Insular Government, formulated a plan for the establishment in Manila of Central Government laboratories for the performance of routine work and original scientific research, of a medical college, and of a General Hospital, all to be located as near each other as practicable, upon a lot large enough to provide for all probable future expansion, the three institutions to be so interrelated that the Government laboratories might do routine work for the hospital and at the same time carry on original research relative to the causation and relief of disease, utilizing for the latter purpose material furnished by the hospital; that the laboratory staff might be available for teaching in the medical school and for service in the hospital; that the students of the medical school might have abundant opportunity for practical instruction in the hospital wards and clinics; and that the members of the teaching staff of the medical college might have opportunity not only to aid in the hospital work but to carry on their own original investigations in the laboratory.

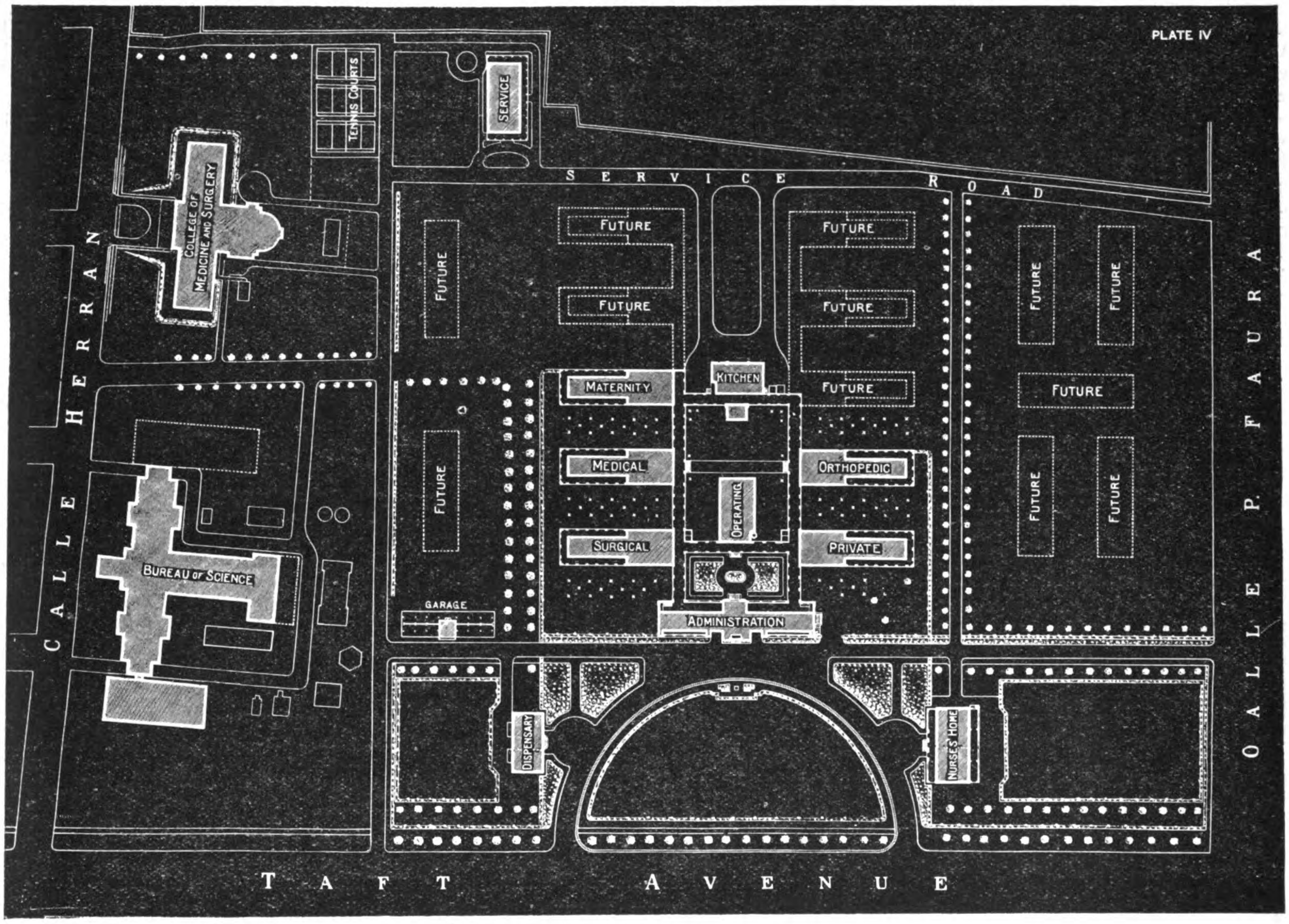
The realization of this project seemed so improbable that its originator was called "crazy," while the plan itself was commonly designated as "Worcester's dream." The first step toward its realization was taken when the Bureau of Government Laboratories was established on July 1, 1901, by the passage of an act which provided for the centralization of all the biological and chemical work of the Insular Government. A further and great advance was made when the Philippine Bureau of Science, into which the Bureau of Government Laboratories ultimately developed, occupied the carefully planned and well equipped laboratory building constructed for its special use. This building was erected on the so-called Exposition Grounds which afforded a conveniently situated site of sufficient size to accommodate all of the buildings needful for a medical school and for a hospital of a thousand or more beds, but at the outset other plans were entertained relative to the future of that portion of the land in this tract not needed by the Bureau of Science, and it was only after a long and determined contest that its reservation for a hospital and a medical school was secured. Then followed the establishment of the medical school itself, which was provided for by a law enacted on December 1, 1905. The school was at first, of necessity, given temporary quarters pending the construction of a suitable home for it. The medical school building, which stands on the Exposition Grounds immediately to the west of the building of the Bureau of Science, was occupied on June 1, 1910.

The completion and occupation of the splendid group of reinforced concrete buildings which now constitute the Philippine General Hospital marked the full realization of "Worcester's dream."

Immediately after the arrival of the American army in the Islands military hospitals were established in Manila. The military medical corps extended the courtesies of the army hospitals to civilians when it was possible to do so but, of necessity, this service was highly unsatisfactory to the citizens of Manila.

In spite of the efforts made to establish a hospital for the accommodation of civilians, this state of affairs continued until the month of March, 1901, when the situation was somewhat relieved by the establishment of the Women's Hospital at 350 Gral. Solano. This institution was intended, primarily, for the accommodation of women and children only, but in urgent cases men were admitted also.

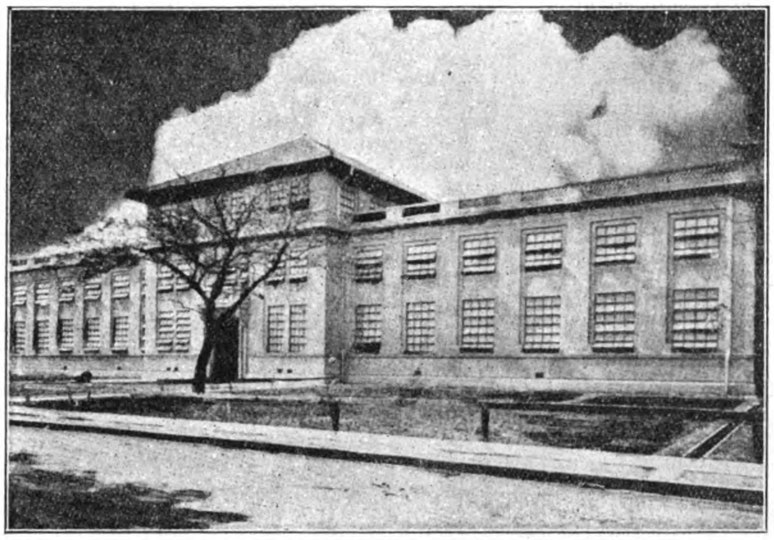
A short time after this an agreement was reached between the hospital authorities and the Government officials, whereby Civil Government employees were to be given medical and surgical attendance in this institution, but, unfortunately, it was soon discovered that the facilities here were inadequate to meet the demands of the situation; moreover, the American population was rapidly increasing,



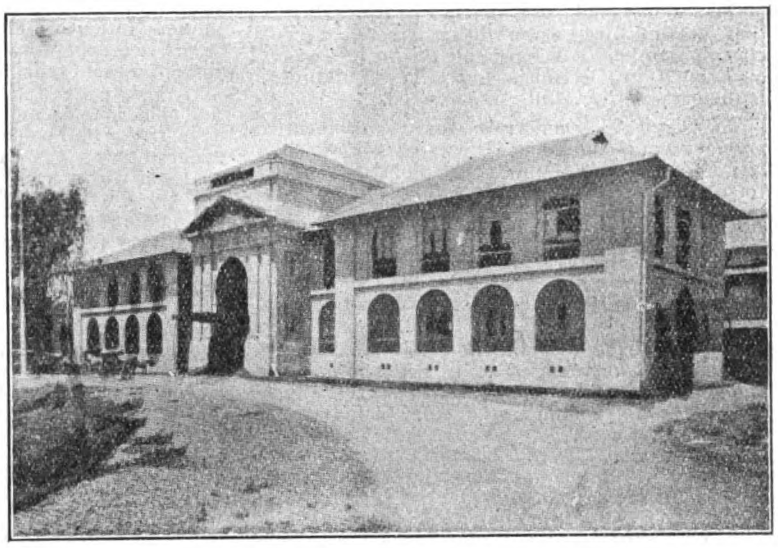
GROUND PLAN OF THE PHILIPPINE GENERAL HOSPITAL

which made it imperative that other accommodations be provided.

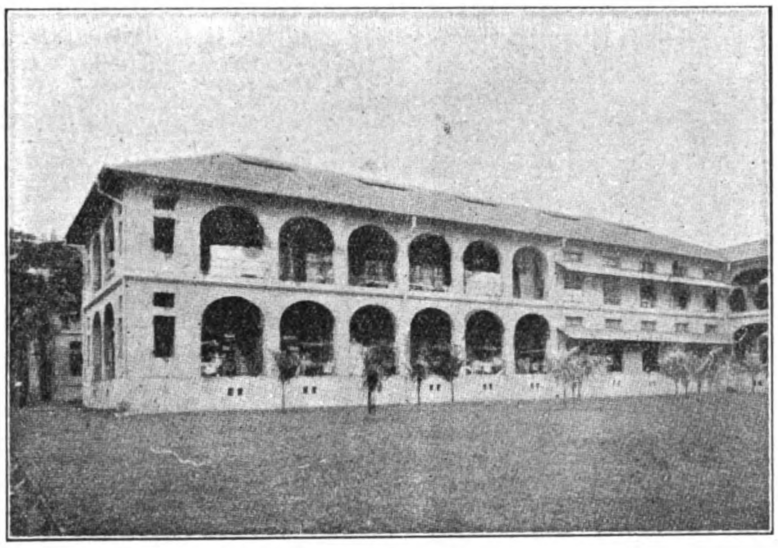
The first step toward relieving the situation was taken on August 6, 1901, when the Philippine Commission, by the passage of Act No. 189, made it incumbent upon the Civil Government to render medical assistance to its employees and their families. This provision was followed, on October 1, 1901, by the passage of Act No. 247, which established the Philippine Civil Hospital. The need for the hospital was so great that the necessary equipment was quickly procured and the institution opened within the month, in a part of the buildings on Calle Iris in which it was located



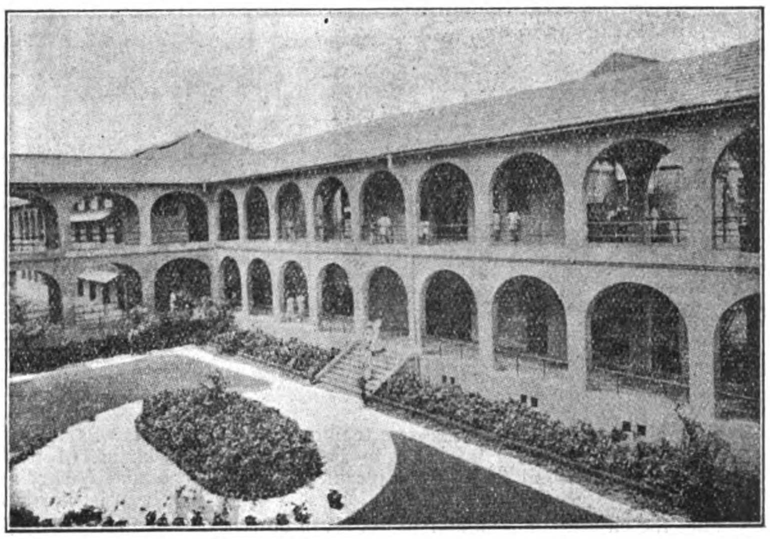
COLLEGE OF MEDICINE AND SURGERY



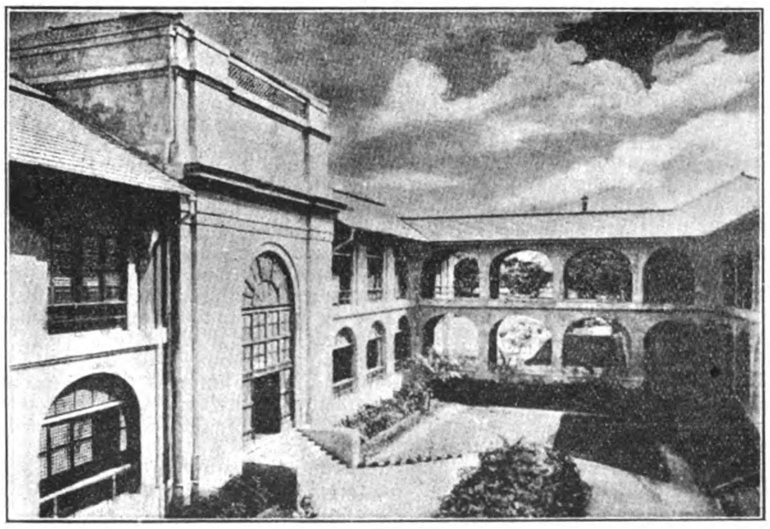
ADMINISTRATION BUILDING



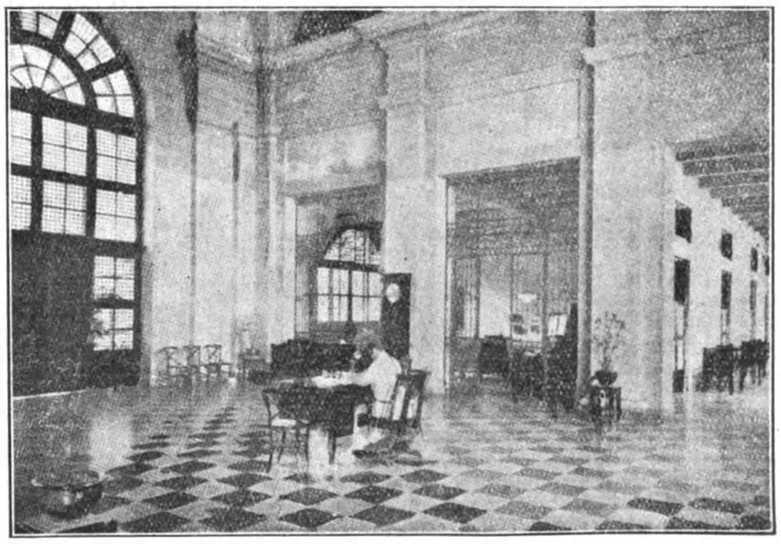
SURGICAL PAVILION



COURT AND CORRIDORS



COURT FACING FRONT OF ADMINISTRATION PAVILION



VESTIBULE, ADMINISTRATION BUILDING

at the time it was abolished on the opening of the General Hospital in 1910.

In the meantime the Women's Hospital had been merged with the Cosmopolitan Hospital for which subscriptions had been raised and a building erected. Elaborate plans were made for expansion but at the critical period enthusiasm waned, and, partly due to the fact that patients were now being treated very cheaply at the Civil Hospital, the project was abandoned in December 1902. This building is the present City Hall.

The Civil Hospital rate for Government employees was placed at P2 per day for wards and P5 for private rooms, (one peso, P, is equal to 50 cents U. S. currency) and accommodations were furnished at P3 per day for wards and P6 for private rooms to those not in the employ of the Government. It cost the Government an average of about P8.50 per person per day for all patients for subsistence, quarters, and attendance.

It was realized that the hospital was badly located and poorly suited to its needs in many ways, but at this time it was practically impossible to obtain satisfactory buildings.

beds planned for at the ouset, insisting that 300 should be provided for instead of 200 proposed. The arguments which they brought forward in favor of this course seemed unanswerable, and the Director of Health and the Secretary of the Interior united in requesting the Commission to appropriate the sum of P780,000 in order to make possible the erection of a central administration building, a surgical pavilion with two operating rooms, a building for dispensary and outclinic, five ward pavilions of sixty beds each, a nurses' home, a kitchen, an ambulance stable, and morgue. By unanimous vote of the Philippine Commission the full sum requested was appropriated.

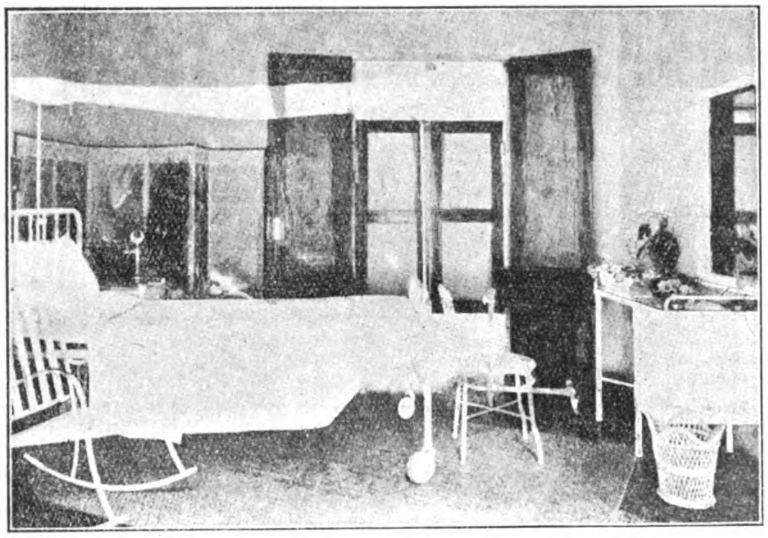
It was with a profound sense of gratification that those who had labored so long and earnestly for the completion of the project finally saw a chance for the realization of their hopes. With the necessary funds available the greatest obstacle had been swept away, although the real, active, hard work remained to be done as there were a multitude of details to be thought out and unforeseen complications arose continually.

A meeting of the Philippine Islands Medical Society was to held in Manila early in 1908

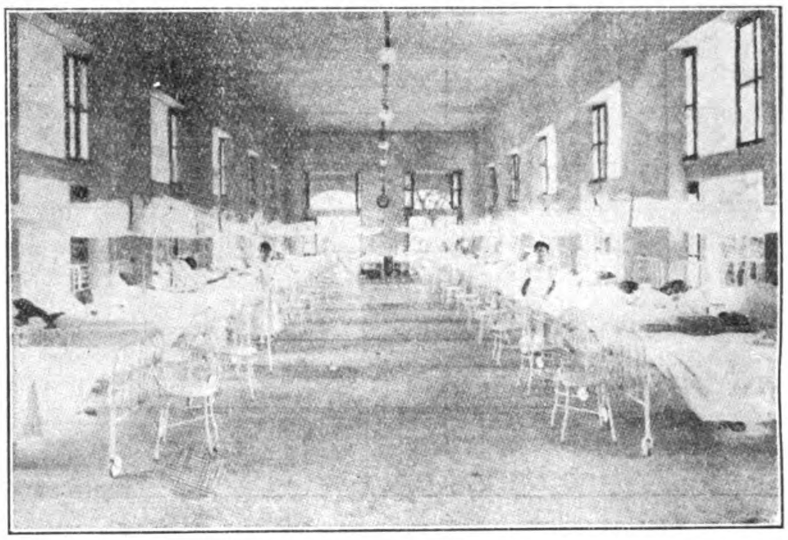
After the structures were erected the process of finishing the interior and obtaining and installing equipment necessitated several months so that the opening of the institution was deferred to a much later date than was originally intended.

As previously stated, the long looked and hoped for day arrived and the hospital was officially opened on September 1, 1910, and a largely attended public reception was held in the hospital in honor of the event. On the following day ten patients were transferred from the old Civil Hospital to the new structure: coincident with this act the former institution passed into oblivion after more than nine years of useful, if somewhat turbulent, existence.

The new hospital is situated nearly in the center of a tract of land bounded by Calle Padre Faura on the north, Taft Avenue on the east, Calle Herran on the south, and the weather observatory grounds on the west. This tract contains nearly 11 hectares (27 acres) and is known as "Medical Center' on account of the Bureau of Science and the College of Medicine and Surgery being located on the same plot.



PRIVATE ROOM



FEMALE WARD

Then again it was only intended as a temporary location, as the original intention to build a large general hospital had by no means been abandoned.

That the citizens of Manila had not given up the idea and that the question was to them a very live one was evinced by a petition to the Governor and Commission in the early part of 1903.

Quoting from the address of the Secretary of the Interior upon the occasion of the laying of the cornerstone we find the history of the formative period of the hospital related as follows:

As rapidly as possible Mr. W. E. Parsons, the Consulting Architect to the Commission, prepared preliminary plans and estimates, and prior to the departure of the Secretary of the Interior for the United States in October 1906, they were transmitted to the Commission with an urgent request from that official and from the Director of Health that the necessary funds for carrying them out be immediately appropriated and the construction work inaugurated as soon as possible.

Other counsels prevailed, however, and the whole project was laid on the table where it was found peacefully reposing by the Secretary of the Interior on his return in April, 1907.

Before making final recommendation to the Commission, he deemed it fitting and desirable to secure the opinion of the faculty of the newly established Philippine Medical School as to the necessity for a Government general hospital. The faculty immediately approved the project but objected to the small number of

and this was deemed an opportune occasion of the laying of the cornerstone of the new hospital. Accordingly, although no contracts had been let nor had the exact locations of the different structures been determined, the cornerstone was laid February 28, 1908.

The herculean task of perfecting plans and specifications for the different structures, in order to have them adapted to their purpose and at the same time be covered by the appropriation and the deciding of many other details consumed considerable time so that bids were not advertised for until June 24, 1908. When the bids were opened on July 27, it was found that the lowest bid had been made by H. Thurber, of the Manila Construction Company. He was accordingly awarded the contract for the erection of the administration, medical, surgical, maternity, private, orthopedic, and operating pavilions and the kitchen, on September 8, 1908 for the sum of P530,804. His contract specified that these structures be of reinforced concrete and that they be completed within 240 working days. The plumbing, wiring, filling, and a few other minor details were not included in this bid.

Actual construction work was begun shortly after the awarding of the contract but the usual number of vexatious delays occurred, conferences were held and changes in plans made until it became evident that the buildings would not be completed within the specified time. The contractor asked for and received two extensions on the time contracted for, the sum of which extended the date for the completion of the structural work to November 30, 1909.

(See block plan). It is most conveniently located, being well within the city limits and accessible by two trolley lines.

New Germinal Tobacco Factory:—On September first the Germinal Cigar and Cigarette Factory, will begin the construction of the largest contrcte building yet planned for Manila.

The new building will be located on 3,500 meters of land which lies alongside of the present factory building, and has a frontage of 35.5 meters. It will be four stories high and fitted with electric elevators, overhead electric conveyors, and all other appliances that will increase the speed, and lessen the cost, of handling large quantities of tobacco.

The building will be used entirely for the manufacture of cigars and cigarettes and will be modeled and fitted after the very latest factories in Germany, Cuba and the United States. The cost is estimated at P. 140,000.

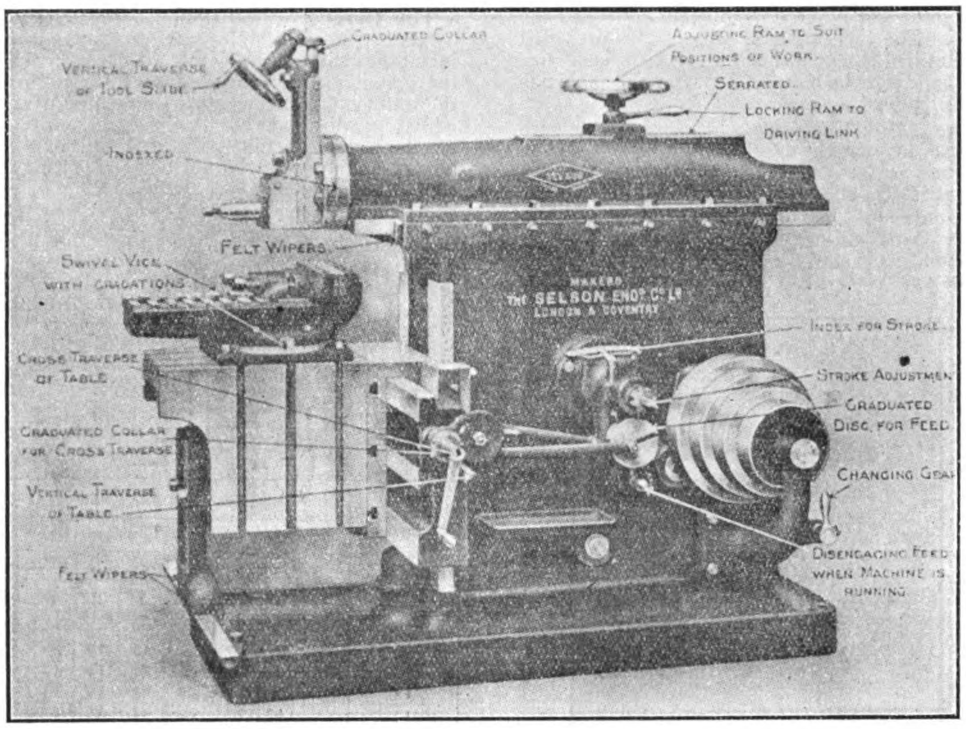
If the present plans of the company are carried out, as soon as the factory is completed, the old factory will be torn down and the new building extended over to the Ayala bridge at an additional cost of about P150,000.

Mr. Delmar Smith-Clinton is the contractor in charge of the preliminary work, and piles are now being driven for the foundation of the new building.

The Germinal Company will also build a new concrete factory at Malabon for the manufacture of cigars only.

Bids for the new factories have not been awarded, but will probably be let soon.

SELSON MACHINE TOOLS



25 AND 30 IN. DOUBLE-GEARED SHAPERS

The Selson Engineering Co. Ltd., of 85, Queen Victoria Street, London, have recently published a new and very complete catalogue (a copy of which is at the disposal of prospective buyers), of their well-known Selson Shaping Machines which are made in two patterns, (Standard and Special) and six sizes, viz.: from 10"-30" stroke. The Special pattern differs from the Standard in having a traversing head and traversing bottom table, the ordinary table being hinged so that it can be swung aside, and will thus accommodate large and heavy pieces and will do work hitherto done on the Planer.

DESCRIPTION.

General Construction.—The machines have been built for heavy cutting and to run at high speeds, although, owing to the high range of speeds, any practical cutting speed for such different materials as brass and hard die-steel can be obtained for any length of stroke. As improvements are constantly being made the illustrations and weights given, although correct in the main, cannot be considered binding.

Main Frame is a box casting, strongly ribbed and provided with a door, for easy access to the main driving link and driving gears. It is cut away directly underneath the ram, in order to admit long shafts for the purpose of keyseating.

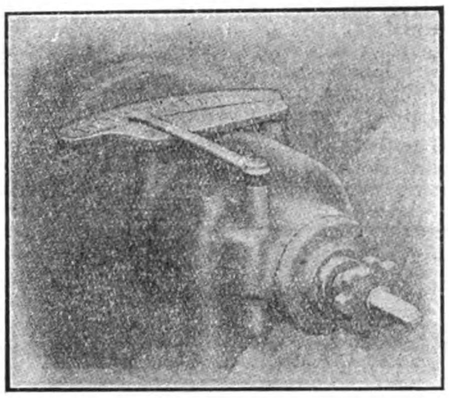
Base Plate, which is firmly secured to the main frame by turned bolts and lock nuts, is extended well to the front to give steadiness to the machine when working and to carry the table support. It is dished to form a trough to catch the waste lubricant and cuttings and prevent them from collecting on the floor of the shop.

The Ram is of arched form, strongly ribbed and carefully proportioned to give ample strength and rigidity without undue or excessive weight. The bearing surfaces are wide and run in square guides, which are provided with felt wipers to keep them clear of dirt and cuttings; there is also ample provision for taking up the wear of the sliding parts. The adjustment is quickly effected by a hand wheel **placed on the same centre as the locking handle,** making a compact, handy, and time saving arrangement. The top of the ram and locking plate are serrated, to prevent any possibility of slip under the heaviest cut.

The Tool Head is arranged to swivel through a complete circle and graduated in degrees, so that it can be set immediately to any angle. It is locked in place by a hand lever and gripping pad in the 10 in.-13 in. and 17 in. sizes, but, in the larger machines, where the heaviest cuts are taken and strength is of the first consideration, strong bolts are used. The tool slide is adjusted vertically by hand wheel which, on the 25 in. and 30 in. sizes, is brought well below the top of the slide and connected to the screw by angular shaft and bevel wheels, as illustrated above, for ease of manipulation. The screw is provided with a micrometer index. The vertical feed is actuated by hand on all standard machines, but, on the 17 in. Double Geared and larger sizes, if required, it can be made automatic at an extra cost. The tool post can be set to any angle and the flapper box is also arranged to swivel, in order to give the proper rake to the tool.

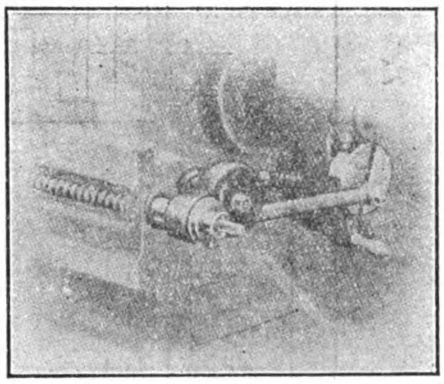
The Main Driving Link, or rocker arm, is connected to the ram by a short link which gives a **draw stroke and ensures a smooth cutting motion.** The crank pin block is so arranged that there is no overhang between the large driving wheel and the link, thus avoiding undue side strains. The sliding block is carefully scraped dead parallel with its slide and provision made for taking up the wear.

The Stroke can be altered to any position by a crank handle **when the machine is running or stationary.** This handle also controls a pointer which registers the exact length of stroke **on a stationary index placed on the feed bracket in full view of the operator** (see illustration). This arrangement will be found much more convenient and accurate than the customary one where the index is placed on the moving ram.

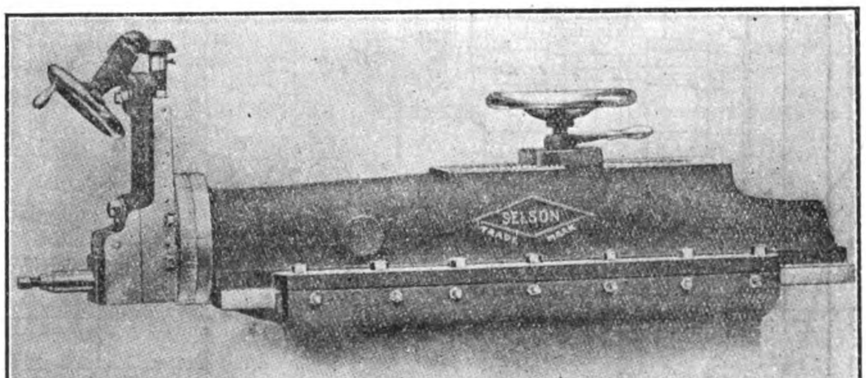


The Table Cross Slide is vertically adjustable by hand on the main frame, the guides being square and of good width. The screw for the vertical movement is non-rotating for the smaller sizes, but for 21 in. and upwards, for which this design is impracticable, it is of the telescopic pattern, both arrangements being such that no portion of the machine projects at any time below the floor line, so that the machine can be placed in any convenient position in the shop without considering a hole in the foundatton.

The Cross Feed is of a special design, (Patent applied for), and, on the 17 in. Double Geared Machine and upwards, is so arranged that **the whole of the feeding mechanism**



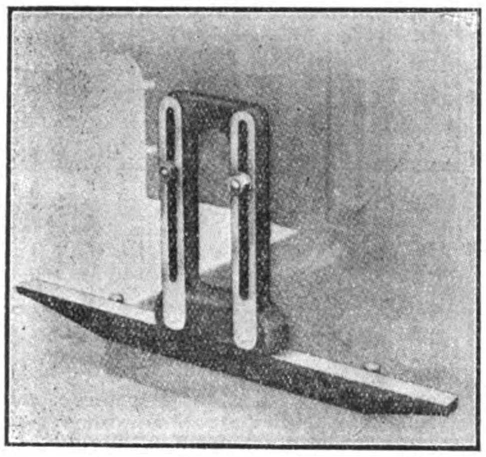
can, by depressing a hand lever, be thrown out of action when the machine is running



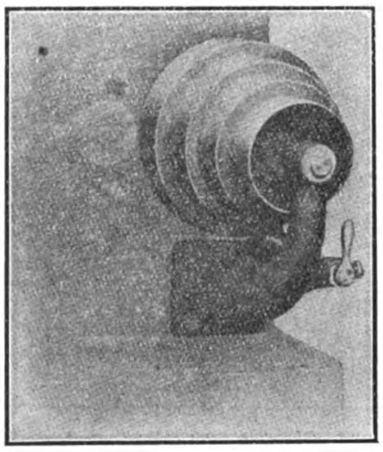
THE RAM

at any speed. This is of special importance, as the feed can then be altered or reversed with perfect safety without disturbing the driving mechanism, **a feature which is not found on any other machine of this type.** The rates of feed are indicated by a pointer and index, and, after the alteration has been made, **the feed mechanism, by a partial turn of a knob, is automatically set again in motion.** The cross slide screw is fitted with a micrometer index for accurate adjustment and a safety device is introduced, which prevents any breakage of the feed mechanism, should the operator, through carelessness, omit to stop the feed before the table slide has reached the end of its traverse. The feed bracket is free to swing on the main driving wheel bearing and connected to the vertical slide in such a manner that the feed connecting rod always remains at a workable angle.

The Table is of ample proportions and has milled slots on the top and sides for holding the vice or work; these are of the same centres throughout, so that the vice or special jigs can be used equally well on the three surfaces. The back is carefully scraped to bed on the table slide, in order to avoid distortion when clamping up, and a vertical groove, for setting shafts or cylindrical objects, is planed in one of the sides. The front of table slide is also provided with milled slots, so that objects of special size or shape can be bolted to it after the table has been removed.



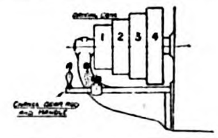
The Table Support, which has a wide base to prevent undue overhanging strains, when the cut is on the outside of the table, is arranged to slide on rollers to minimise the friction and provided with felt wipers to prevent cuttings getting between the rollers and bearing, which would cause spring and inaccuracy. It is brought further to the front



than is usual with machines of this type and firmly locked to the table by strong bolts. Special attention is paid to the bearing on the base being exactly parallel with the guide on the vertical slide for the table, as, if there be an inaccuracy in these parts, exact work is impossible. This support is included in all machines from 17 in. Double Geared upwards, but we do not consider it necessary for the smaller sizes.

The Drive for the standard machine is by 4-speed cone pulley for all sizes. Up to and including the 17 in. Double Geared machine the driving shaft bearing is carried well inside the pulley, to prevent overhanging strains, whilst an additional outside bearing is provided on the larger machines. When desired, a gear box with motor or single belt drive, may be substituted for the cone pulley. The driving shafts are ground truly cylindrical at their bearings and run in bushes which can be easily replaced.

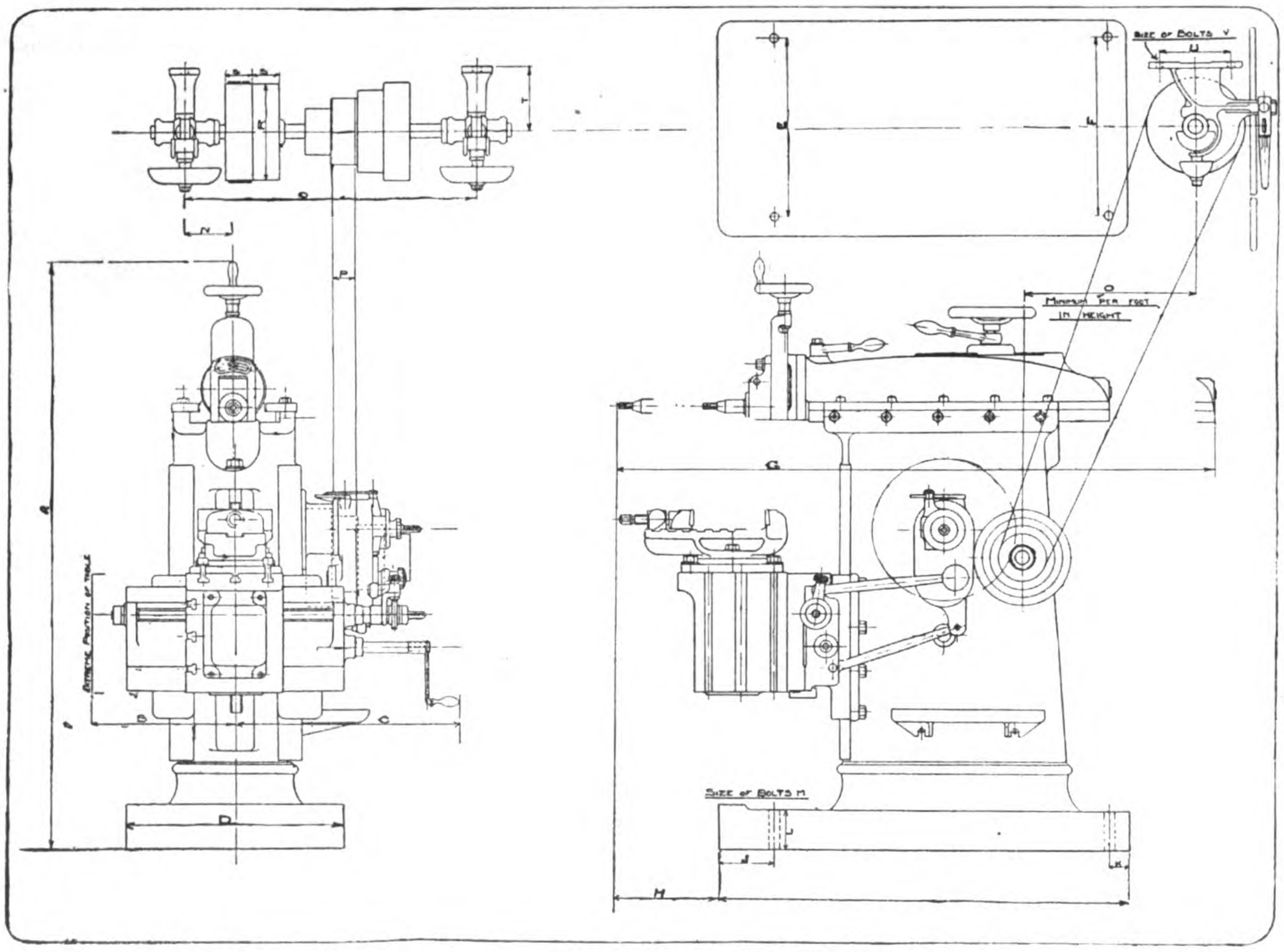
25IN. STROKE SHAPING MACHINE.



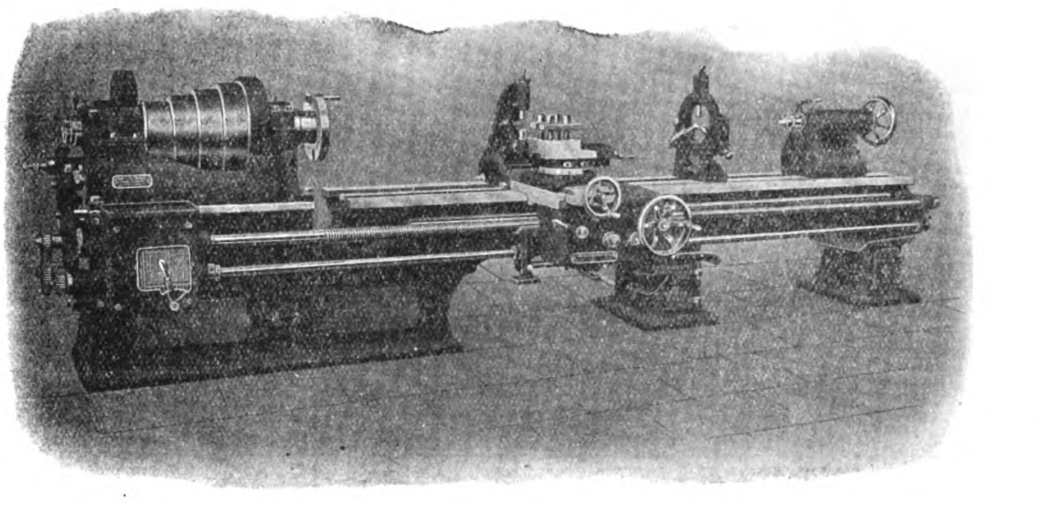
Length of Stroke in inches.	CUTTING SPEED IN FEET PER MINUTE.							
	Gear Change Handle at A				Gear Change Handle at B			
	No. of Speed on Cone.				No. of Speed on Cone.			
	1	2	3	4	1	2	3	4
3	40	28	18	12	—	—	—	—
6	74	50	35	23	14	10	—	—
9	110	74	50	34	22	14	10	—
12	—	95	67	44	29	19	14	—
15	—	117	77	54	34	23	15	11
18	—	—	93	63	41	28	18	13
21	—	—	109	73	46	32	21	14
25	—	—	130	85	55	37	27	17

Speed of Countershaft 280 revolutions per minute.

The Double Gear, so called, which is, in reality, two gears of low and high ratio, can be



SELSON STANDARD SHAPING MACHINE



SELSON HIGH SPEED LATHE

In additon to the above named tools the Company have a number of other specialities made solely for them from their own designs and are in a position to supply all descriptions of Engineers' Machine and Hand Tools and accessories, of which they publish a very complete catalogue, (latest issue 1911), a copy of which will be sent on application to intending purchasers in the Fast East.

Building Activity in Tsingtao.—Tsingtao is experiencing a substantial building boom, no less than 250 buildings being in the course of erection. This is due to the influx of Chinese ex-officials, who have taken up their homes in Tsingtao under the protection of the German Government, which has rescinded in their favor, a regulation heretofore confining all Chinese to a certain section of Tsingtao called Tapatao. All Chinese of the better class, after an investigation of their standing and capacity, are now permitted to own property and live among the better class of foreign residents.

As the vacant lands are owned by the Government, and are sold to the highest bidder after a price limit is set upon the property, the income from land sales recently has been considerable.

easily and quickly changed by a handle brought to the front well clear of the belt, so that it is in a perfectly safe position for the operator, and does not, in the slightest degree, limit the position of the countershaft.

A Speed Table is supplied with each machine, showing the correct position of belt and gear shifting handle for various strokes at any desired speed. It does not state the revolutions or number of strokes per minute as, for practical purposes, this is quite unnecessary. All the operator has to do is to select the amount of stroke and cutting speed and find from the table which step of the cone and gear to use. This table is also of great value to the foreman or overlooker, **as he can see, at a glance, if the machine is being run at its proper speed.**

The Vice, which is supplied with every machine, is arranged with a graduated base so that it can be quickly set to any desired angle. The movable jaw can be quickly adjusted to suit varying widths of work and is arranged to swivel, so that **it can be used equally well for parallel or taper objects.** The jaws are made of mild steel and are firmly held in position by strong screws. As the centres of the table slots are the same throughout, the vice can be applied equally well to the top and sides of the table.

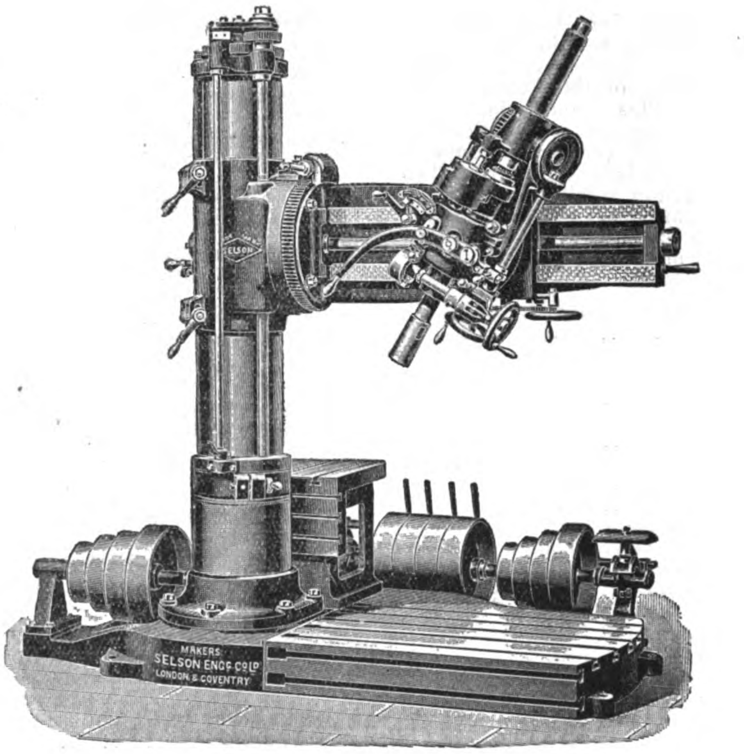
The Countershaft is fitted with oil-retaining bearings, rendering frequent attention unnecessary. It can be placed in any desired position, as the angle of belt is practically unlimited.

The Oiling Arrangements have been carefully considered and are most complete, giving no excuse to the workman for ignorance or neglect. Lubricators or dust-proof covers are fitted throughout t all bearings for revolving parts and placed in easily accessible positions.

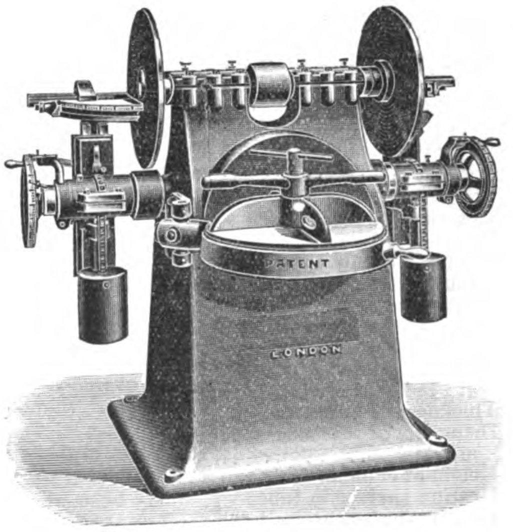
The Accessories supplied with each machine comprise Vice, Countershaft, Tool Tray, arranged to bolt on main frame, all necessary Handles and Wrenches, Speed Table and Table of Instructions for the manipulation of the machine.

These tools together with Radial Drilling Machines (both Central-Thrust and Universal) and High Speed Lathes (cone drive and all geared) are specialities of the Company and are made at their new and well equipped works at Coventry. The Central Thrust Radial is made under a patent of the firm's and a good demand has already been found for this tool, which is made in two sizes viz.: 4′ 6″ and 6′ radius.

Other specialities made at their Coventry works are Patent Brass Finishers' Lathes, on which four different pitches, (internal and external), can be cut by simply revolving a turret carrying the hobs and tools—Upright Drilling Machines and Disc Grinders, the latter being fitted with patent press.



SELSON RADIAL DRILLING MACHINE

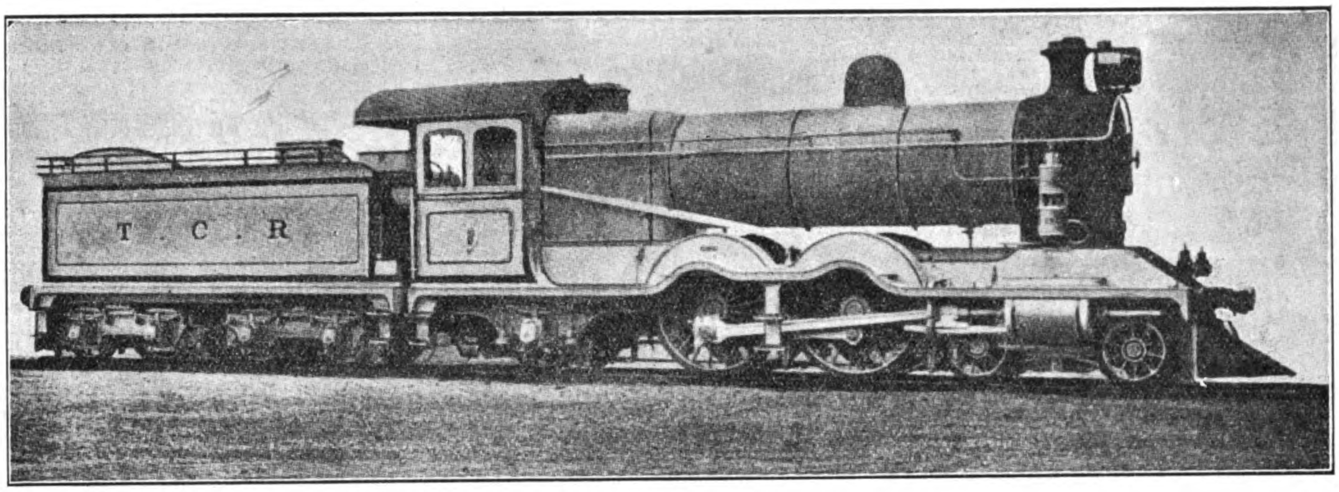


SELSON DISC GRINDER

Quingua River Bridge Tenders.—The directors of the Bureau of Public Works, opened the bids for the construction of the substructure and the erection of the superstructure of the Quingua River Bridge, and the following bids were submitted.

(a) Insular Construction Company, P43,231.60; John Gordon, P38,800.00, Atlantic, Gulf and Pacific Company, P39,465.50; (a) A. F. Allen, P43,726, Delmar Smith Clinton, P48,530. The bridge will be of three 39.62 meters (130 feet) steel spans on concrete piles and abuttments. The Atlantic, Gulf and Pacific Company have been awarded the contract for the fabricated steel for the super-structure by the province.

Perak River.—The Perak (Federated Malay States) Chamber of Commerce have asked the Government to consider a suggestion for bridging the Perak river at Parit, where at present there is only an old ferry,



ATLANTIC TYPE EXPRESS LOCOMOTIVE FOR THE CHINESE GOVERNMENT RAILWAYS.

An engine has recently been built by Kerr, Stuart and Co., Limited, for the Tao-Ching Railway, in China, or, more exactly, for the Taokou-Ching-hua lines of the Chinese Government Railways. This engine, which was constructed to the design and specification of Mr. Donald Fraser, the Locomotive Superintendent of the line, includes more than the usual number of novelties, as will be seen from the following list of particulars. The engine and tender loaded weigh 120 tons. The following are its leading particulars:—

Cylinders—
Diameter of cylinders .. 19in.
Stroke of pistons .. .. 2ft.
Cast iron piston valves, outside admission, diameter 8in.
Width of steam ports .. 1⅜in.
Distance apart of cylinders, centre to centre .. .. 6ft. 9½in.
Distance between centres of valve spindles .. .. 2ft. 3in.
Lap of valve .. .. .. 1 1/16in.
Lead of valve (in full gear) ⅜in.
Maximum travel of valve 4 ?/16in.
Stephenson link motion ..
Diameter of piston-rod .. 3½in.
Length of slide blocks .. 1ft 9in.
Length of connecting-rod between centers .. .. 10ft. 9in.

Wheels (steel)—
Diameter of driving and coupled wheels .. .. 6ft.
Diameter of trailing wheels 3ft. 7in.
Diameter of bogie wheels .. 3ft.
Thickness of all tires on tread .. .. 3in.
Width of all tires on tread 5½in.
Distance from centre to centre of driving wheels 6ft. 6in.
Centres of bogie wheels .. 6ft. 4in.
Centres of driving wheel to centre of trailing wheel 8ft. 7in.
Distance from centre of driving wheel to front of fire-box .. .. 2ft. 6in.

Axles (steel—
Driving and coupled diameter of wheel seats .. .. .. 8⅜in.
Driving and coupled diameter of bearings .. .. 8in.
Driving and coupled length of bearings .. .. .. 9in.
Driving and coupled diameter at centre .. .. 7¾in.
Centre to centre of all bearings .. .. 3ft. 7½in.
Trailing axle diameter of wheel seat .. .. 8in.
Trailing diameter of bearings inside and outside .. 7in and 6½in.
Trailing length of bearings inside and outside .. .. 9in. and 11in.
Trailing diameter at centre 6¾in.
Trailing centre to centre of outside bearings .. .. 6ft. 7in.

Bogie axles, diameter of wheel seat .. .. 6¾in.
Bogie axles, diameter of bearings .. .. 6in.
Bogie axles, length of bearings .. .. 9in.
Bogie axles, diameter at centre .. .. 5⅞in.

Crank pins (steel)—
Diameters of driving crank pin .. .. 6in. and 6¾in.
Lengths of bearings .. .. 5½in. and 4in.
Diameter of coupled crank pin .. .. 5¼in.
Length of bearing .. .. 4in.

Frames (steel)—
Distance between frames 4ft. 0¼in.
Thickness of frames .. 1¼in.
Distance between bogie frames .. .. 2ft. 8¼in.
Thickness of bogie frames 1in.

Boiler (steel)—
Centre of boiler from rail 9ft. 4in.
Length of barrel (parallel) 15ft. 10in.
Diameter of barrel oustide 4ft. 9in.
Thickness of plates .. .. 9/16in.
Longitudinal butt joints, treble riveted
Circumferential butt joints, double riveted
Thickness of smoke-box tube plate .. .. ¾in.

Fire-box (steel)—
Length outside .. .. .. 8ft. 10in.
Breadth outside at bottom 5ft. 2in.
Depth below centre line at front end .. .. 4ft. 3in.
Depth below centre line at back end .. .. 3ft. 2in.
Thickness of front plate .. ⅝in.
Thickness of back plate .. 9/16in.
Thickness of sides and top ½in.

Internal fire-box (steel)—
Length at bottom, inside .. 7ft. 11 5/16in.
Breadth at bottom, inside 4ft. 4⅜in.
From top of box to inside of shell .. .. 1ft. 6⅛in.
Depth of box inside at front 5ft. 3in.
Depth of box inside at back 4ft. 2in.
Diameter of Low Moor iron stays .. .. ⅞in.
Distance of stays apart .. 3¾in.

Tubes (steel zinced)—
Number of tubes 193
Length of tubes between tube plates .. .. 16ft. 2⅝in.
Diameter outside of tubes 2¼in.
Diameter outside of tubes at smokebox end .. .. 2 5/16in.
Diameter outside of tubes at fire-box end .. .. .. 2⅛in.
Thickness of tubes .. .. 11 w.g.
Diameter of exhaust pipe nozzle .. .. 5in.
Height of chimney from rail 14ft. 5½
Heating surface in tubes .. 1843.65 sq. ft.
Heating surface in fire-box .. 132.35 sq. ft.

Total .. .. 1976 sq. ft.

Area of fire-grate .. .. .. 35 sq. ft.
Working pressure .. .. .. 180 lb. per sq. in.

Tender wheel base—
From front buffer beam to front bogie centre .. .. 6ft. 6in.
From front to hind bogie centres .. .. 11ft.
From hind bogie centres to back buffer beam .. .. 5ft. 1in.
Centre to centre of bogie wheels .. .. 5ft.

Wheels (steel)—
Diameter of wheels on tread 3ft, 1in.
Thickness of tires .. .. 3in.
Width of tires 5½in,

Axles (steel)—
Diameter of bearings .. .. 5¼in.
Length of bearings .. .. 9in.
Diameter of wheel seats .. 6¾in.
Length of wheel seats .. 6in.
Distance between centres of bearings .. .. 6ft. 4in.

Frames (steel)—
Distance between frames .. 6ft. 1½
Thickness of frames .. .. ⅞in.
Distance between bogie frames .. .. 5ft. 9¼in.
Thickness of bogie frames ⅞in.

Capacity of tank .. .. .. 4250 gollons
Capacity of coal space .. .. 8 tons
Tractive force .. .. 19,277 lb.
Tractive force per ton of adhesive weight .. .. 507 lb.

Weights—	Tons.	cwt.
Weight of engine in working order:		
On bogie wheels	15	10
On coupled wheels	38	0
On trailing wheels	17	17
Total	71	7
Weight of engine empty ..	65	1
Weight of tender in working order (front bogie)	24	2
On hind bogie	24	11
Total	48	13
Weight of tender empty ..	21	13
Total weight of engine and tender in working order	120 tons	

The engine is fitted with the following:—Westinghouse quick-acting automatic brake; Westinghouse steam heating apparatus for carriages; Holden and Brooke's steam sanding apparatus fitted in front of leading coupled wheels; Gresham's No. 9 combination injectors; the boiler and cylinders are clothed with the Cape Asbestos Company's Pluto brand mattresses, and the piston-rods and valve spindles are fitted with the United Kingdom Metallic Packing Company's packings; Laycock's patent combination automatic couplers; the Dayton Manufacturing Company's acetylene gas head lamp, with "Mosher" gas generator enclosed in anti-freezing cabinet and fitted with purifier; and Smith's patented combined lubricator and cylinder vacuum destroying valves.

CHINESE GOVERNMENT RAILWAYS

PEKING-MUKDEN LINE

Tenders are invited for the following:—

INDENT No. 2111.

281,000 Japanese Sleepers 8′×9″×6″ of Nara, Yachitamo or Katsura.

Quality.—The quality of timber must be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects. All must be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. Two (2) full-sized samples of each timber to accompany Tender, which otherwise will not be entertained.

Delivery.—To be delivered as follows:—

(*a*) 170,000 on Hsinho Wharf.

(*b*) 111,000 on Yingkow Wharf.

(*a*) First consignment of not less than 25,000 to be delivered not later than 1st April, 1913. The balance to be delivered before the 1st August, 1913, in consignments of not less than 25,000 per month.

(*b*) First consignment of not less than 25,000 to be delivered not later than 1st April, 1913. The balance to be delivered before the 1st July, 1913, in consignments of not less than 25,000 per month.

A penalty of One Tael Cent (Tael 0.01) per Sleeper per day will be imposed for each day of delay.

INDENT No. 2112.

4,350 Japanese Crossing Timbers, as under:—

800	Crossing Timbers	9′ 0″×9″×7″
700	,, ,,	10′ 0″×9″×7″
625	,, ,,	11′ 0″×9″×7″
650	,, ,,	12′ 0″×9″×7″
770	,, ,,	13′ 0″×9″×7″
440	,, ,,	14′ 0″×9″×7″
180	,, ,,	15′ 0″×9″×7″
155	,, ,,	17′ 0″×9″×7″
30	,, ,,	18′ 0″×9″×7″
Total...4,350.		

Quality.—The whole of the above to be either of best quality Yachitamo or Nara (White Oak) *i.e.* not a mixture of both. To be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. To be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects. Full-sized 9 feet sample to accompany Tender, which will not be entertained otherwise.

Delivery.—To be delivered on Railway Wharf, Hsinho, not later than 1st May, 1913.

A penalty of Two Tael Cents (Tael 0.02) per Crossing Timber per day will be imposed for each day of delay.

INDENT No. 2113.

7,100 Bridge Ties 10′ 0″ × 9″ × 8″ of Oregon Pine or Japanese White Oak (Nara). To be sawn on all four sizes strictly in accordance with above measurements.

Quality.—The timber must be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects and must be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. Full-sized samples to accompany Tender, which will not be entertained otherwise.

Delivery.—All to be delivered on Hsinho Wharf, not later than 1st May, 1913.

A penalty of Two and a half Dollar Cents ($0.02½) will be imposed per Tie for each day of delay.

Quotations.—All quotations to be in Local Currency Dollars.

Inspection.—The above Timbers will be subject to a rigid examination by a Railway Engineer at Hsinho or Yingkow, and will be rejected if not in accordance with the Railway requirements.

Tenders must be addressed to the Managing Director, Chinese Government Railways, Peking-Mukden Line, Tientsin, and marked **Tender for Sleepers, Crossings and Ties,** Indents Nos. 2111, 2112 and 2113, which will be opened at 11 o'clock a.m. on Friday, 6th December, 1912.

Specification forms of Tender may be obtained on application to the above address. No Tender will be entertained unless made upon the forms thus obtained.

The Managing Director does not bind himself to accept the lowest or any tender.

LI TSOI CHEE,
Managing Director.

Tientsin, 7th October, 1912.

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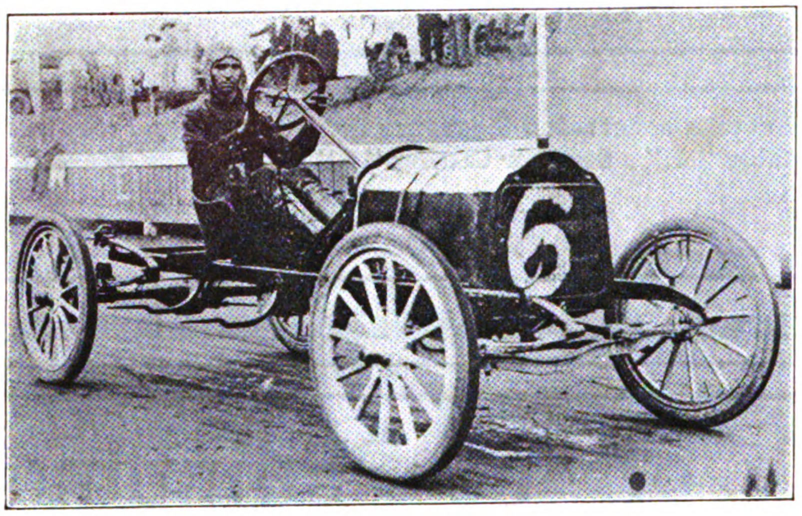

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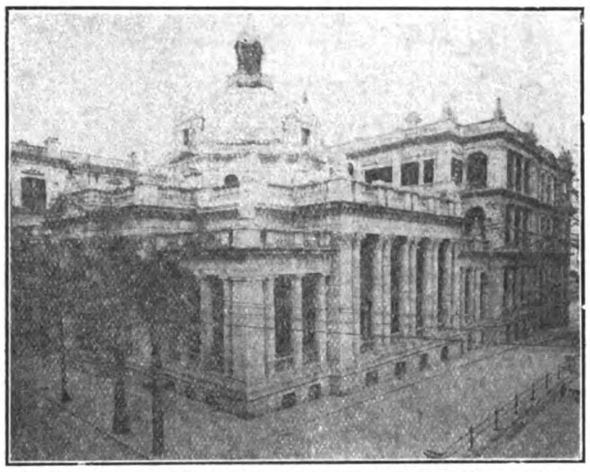

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COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, NOVEMBER, 1912 No. 6.

River, Lake and Land Conservancy in Portions of the Provinces of Anhui and Kiangsu, North of the Yangtsze River

Preliminary Report of Charles Davis Jameson, Mem. Am. Soc. C. E., American Red Cross Engineer

FOREWORD

In those portions of Anhui and Kiangsu which lie north of the Huai River, the Hungtze Lake and the old bed of the Yellow River, south of the Province of Shantung and the present bed of the Yellow River, and extending east and west from the sea to the Ke River, is a section of country which has known but little rest from floods and subsequent famines for the last two thousand five hundred years.

This section is a portion of China's great alluvial plain, extending from the mountains on the West to the sea, and from Shan-hai-kwan to Hanchow. All of this plain is in process of building ; no part is finished, but the least finished portion is that mentioned above, and the changes which are going on in this section form one of the most interesting examples of continent building at present in existence.

What adds to the interest of Nature's work going on here is the fact that we have the history of this section—physical, geographical and human—for the last twenty-five centuries at least. Authentic records show the changes in the river channels, the swinging north and south of the Yellow River, which during that time has passed into the sea at various points between Shanghai and Tientsin, also that at one time—some twenty centuries ago—much of the water of the Yangtsze went into the sea at Hanchow,

CHARLES DAVIS JAMESON.

whilst another portion flowed north into the Huai River and thence to the sea, down the now-called old bed of the Yellow River, ten centuries before the Yellow River made its last visit south.

In addition, the records of the various cities and districts give the years of flood and famine and the amount and kind of relief given to the sufferers; taxes remitted year after year, millions of ounces of silver and tons of free grain. The records also show more or less the work done to prevent the floods, or at least many of their evil effects, and in these records of the work the most noticeable fact is, that whilst enormous sums were appropriated for the building of dams, dykes, and embankments to hold and confine the water and to safeguard certain restricted areas, comparatively little or nothing was done to deepen channels or furnish means for the free and quick passage of the water to the sea. The lower reaches of the rivers were allowed to silt up until there was no adequate outlet, the embankments were raised, the unprotected areas were flooded, and eventually the embankments were broken, and floods and death and famine followed, and with this came immense appropriations for the repair of these embankments, until one can almost believe the truth of the old Chinese saying regarding the conditions

which have obtained for centuries on the Yellow River, "how would we get paid for catching the tiger if he never escaped?" In modern works of this description the object is not only not to catch and confine this tiger, but to allow him to escape by a well prepared and most obvious road as quickly as possible.

During the last ten or twenty years the frightful suffering due to these floods has been brought to the notice of western nations through the foreign missionaries, and year after year hundreds of thousands or even millions of dollars have been poured into China for the relief of the sufferers, three quarters from the United States and most of the remainder from Canada. Year after year this money from outside has gone to feed China's starving millions, and much of China's money has gone the same way, but in all these years China has not made one single effort to have the cause of these almost annually recurring floods investigated, and to ascertain whether it were not possible to lower the flood level and thus do away with the cause of the famines.

The floods have so increased in frequency and the famines in acuteness that now, over the whole area under consideration, the farmers do not average more than two crops in five years, where, if the floods were eliminated, the normal condition would be two large crops each year, and this loss is an ever increasing one. There is but small chance for the people to recuperate. Year after year they plant and the crops are lost. Then there comes a year when there is no seed to plant, then no animals with which to plough, then no ploughs or other farm implements; the house furniture follows, sold for food or used for fuel; then two families move into one hut, and the extra hut goes for fuel with which to boil weeds and the bark of trees; this gone the people steal, murder, beg, and often resort to cannibalism,* and thus one of the richest agricultural sections of China is in such a condition that even robbers are becoming discouraged. No work of any kind is done to improve the rivers, the upper reaches are grown up with reeds, and plants, and the water cannot get away but spreads over the land, making swamps where once were rich fields.

Until this year (1912) the greater portion of Famine Relief has been given free to the sufferers, with the result that to the number of the real victims of the floods have been added all the professional beggars who could work themselves into the crowd, and all persons too lazy to work but not too proud to accept charity, and who had a pull sufficient to procure a famine ticket.

This year, with the exception of old, sick or extremely young people who have no one to work for them, all who get relief have to work for it, and one man's work will feed five people. The result has been satisfactory. The number actually entitled to relief has been reduced by fully one half, and all the work done has been located and laid out so as to make it of permanent conservancy value, the work being either the building or repairing of dykes or the excavation of drainage canals and ditches and the cleaning of the existing canals.

During the summer of 1911 the National Committee of the American Red Cross and the Department of State decided that an Engineer should be sent to China to make a thorough examination of this flood and famine region, with a view to designing some scheme by means of which the flood level could be lowered, the rivers properly trained, and the swamps and shallow lakes drained and made available for agriculture. Through the American Legation in Peking this offer was conveyed to the Chinese Government, which accepted it with much pleasure, stating that it would furnish all the assistance the American Engineer might need in the way of survey parties, etc., and would also pay the field expenses of such parties and the expenses of the American Engineer from the time of the arrival in China until his preliminary examination and work were completed, the National American Red Cross paying the salary of the Engineer sent. I had the honour to be appointed by the National Committee of the American Red Cross with the approval of the Department of State for this work, and arrived in Peking on July 16th, 1911.

DYKE REPAIRING ON THE GRAND CANAL

PART I

As the boundary lines between the different provinces—portions of which are included in the area to be studied—are in no way connected with the topographical features of the country but are purely arbitrary lines, no provincial distinction can be made in the study of the various river systems, or the designing of the work to be done for the lowering of the flood level and the proper draining of the country. The whole area under consideration will simply be treated as a whole in this study, and when the actual work of construction commences it must all be treated from a national standpoint as to finances, personnel, and the methods and sequence in which the work is carried on.

The area to be studied extends from the sea coast on the east to longitude 113° on the west, and between latitudes 36° and 31° on the north. This area in a general way includes the catchment basins of all the river systems involved, and covers approximately one hundred thousand square miles. It contains portions of four provinces, Shantung, Honan, Anhui and Kiangsu, and lies between the Yangtsze River on the south and the Yellow River on the north, and within it is the Flood and Famine Region of North Anhui and North Kiangsu.

Topography

Along the western and south-western borders of this area rise the mountains of Honan, the foothills of the mighty Himalayas. They push through the south-west corner in an east by north direction, following more or less the direction of the Yangtsze River, and form the divide between it and the Huai-ho. As isolated hills they continue to the north-east until they join the mountains of Shantung. With the exception of this divide between the Yangtsze River and the Huai and the isolated hills, the entire area extending from the mountains of Honan to the coast is one vast alluvial plain in the making and not yet finished.

The Dip of the Alluvial Plain

The dip of this plain is as a whole to the southeast, but an examination of the Map will show that the rivers flow in all directions except west.

Climate

The climate is of a mild and temperate character, the thermometer ranging from a maximum of 100° Fah. to a minimum of 20° Fah. The winter is short; the ground freezes to a depth of from two to three inches, and none of

the rivers or lakes become covered with ice.

The soil is a light alluvial and of great richness, with the exception of some fifteen miles along the sea coast, where the elevation is not as yet sufficient to free it from salt.

Rainfall

The rainy season is during June, July and August. Some rains occur during April and are of much benefit to the crops. The rainfall is ample, and when the rivers have been properly cleaned and regulated and provided with outlets, all ordinary floods will be eliminated.

It is impossible to ascertain the average number of inches per normal year, as no records have been kept, but the Chinese records show that years of drought are almost unknown.

At times local rains of great magnitude occur within the famine area. In June, 1910, there was a local downpour in the region of Sze-chow, Ling-pi and Nan-Suchow, lasting some forty-two hours, during which it was estimated by the Divisional Engineer of the Tientsin-Pukow Railway that twenty-four inches of water fell.

No cleaning of rivers or opening of outlets will prevent much damage being done by such a rainfall as this. The mere force of the falling water will pound any standing crop flat to the ground and make it a dead loss. But whereas now the condition of the rivers, drainage canals, etc., is such that even a moderate amount of rain water cannot run away, but stands weeks on the ground until it soaks into sodden, swamplike soil or is evaporated, after the rivers and canals have been put into proper condition, even excessive rainfalls will be able to run off within a few hours, and leave the land in a condition for use. Abnormal storms will always and everywhere cause immediate damage by breaking down the crops, and no work of man can prevent this. The only thing possible is to so conserve the rivers and canals that the waters can pass away as quickly as possible.

Agriculture and Industries

This entire area is strictly one of agriculture. There are no industries of more than local importance, and the existence of these is due entirely to the lack of means of transport.

The agricultural products of North Anhui and North Kiangsu are roughly as follows:—

Wheat.—The most valuable crop. This is sown in the autumn and harvested about the end of May. If there are no spring floods and the rainy season is normal this crop is very large.

Barley.—Sown in November and reaped the end of May. The amount raised is small and relatively unimportant.

Small Pea.—Sown in the wheat in the spring and often harvested with the wheat intended for home consumption; otherwise harvested after the wheat.

Tall Millet.—Planted in April and harvested during the latter half of August.

Small Millet.—Harvested about the first half of August.

Indian Corn.—Harvested about the middle of July.

Sweet Potatoes.—Planted in May and gathered in August.

Oil Bean.—Gathered after the wheat.

Hemp.—Not very important.

Cotton.—Not very important.

Sesame, mustard, opium, peanuts, tobacco, cabbage, carrots, radishes, and a fair *celery.*

THE SURVEYOR'S HOUSEBOAT

These constitute the staple crops, and of these wheat, oil bean and tall millet are the most important.

Up to 1908 the northern portion of the flood region in Anhui was three quarters planted with the poppy. This was prohibited without previous notice, and the people have as yet found nothing to replace it. Buckwheat has been tried, but so far with little success. All the years since the prohibition of the poppy have been famine years, and the small farmers have had no chance to adjust themselves. The opium was an exceedingly valuable crop per unit of ground required and unit of weight of the product, consequently it was the crop for the small farmer, and its prohibition has caused much suffering.

In addition to the above-mentioned staples there is an abundance of good fruit in season, cherries, apricots, peaches, pears, grapes, small melons and water melons.

Owing to the lack of any water power and the absence of coal deposits, it is probable that when the conservancy scheme shall have been fully established and the land put into condition to bring forth its full abundance, it will be cheaper to transport the raw material, cotton, grain, beans, etc., to some central point for the production of the finished article, rather than to establish local mills and factories, but this is one of those economical problems which time alone will solve.

Rivers and Lakes of the Flood Region

The main river systems of the flood region are three, viz. the Shu River, the Yi River, and the Huai River.

The Shu River has its source in the mountains of the southern portion of the province of Shantung, flows south into the province of Kiangsu, then swings to the east through nearly one hundred and eighty degrees and passes into the sea in a north by east direction near the city of Haichow.

The Yi River has its source in the mountains of the southern portion of the province of Shantung to the west of the Shu River, flows in a south-westerly direction, and empties into the Grand Canal through some five channels, the most southern one being at Yao-wan in the province of Kiangsu. The catchment basin of the two rivers is about eighteen thousand square miles.

The Huai River has its source in the distant mountains of the province of Honan and flows east by north into the Hungtze Lake. It has some eighty large tributaries, and drains, or rather does not drain, a catchment basin of some seventy thousand square miles.

In the Huai River system are included not only the rivers which empty directly into the Huai River, but all of those that empty into the Hungtze Lake, as this lake is merely the backwater of the Huai due to the filling up of the regular outlet of the Huai to the sea.

Lakes

The Hungtze Lake, which is merely the backwater of the Huai River, due to its lack of suitable outlet, has an approximate area of four hundred and fifty square miles The greater portion is less than four (?) feet in depth at normal low water, the deepest part being along the southern shore, the old channel of the Huai River when it had free access to the sea, before 1300 A.D.

DESCRIPTION OF THE THREE RIVERS

The Shu and Yi Rivers are distinctly torrential in character. Rising in the deforested mountains of Shantung, a section subject to heavy rains, the upper reaches of these rivers have a steep fall, and the lower reaches, after passing into the alluvial plain, a fall of but a few inches to the mile. In the case of the Shu its course to the sea is long and winding through this alluvial plain, a distance of 85 miles. The last twenty miles near Hai-chow are much silted up, and the consequence is that after a heavy rainfall in the deforested mountains, where there is nothing to absorb the water, it rushes down the steep incline of the upper reaches in a torrent, and upon reaching the flat country with the channel more or less silted up and in no way equal to the rapid carrying off of the large amount of water forced into it, the banks are overflowed and the country flooded, until it becomes one vast shallow lake. Eventually the water passes to the sea by innumerable and unsurveyed canals and creeks.

The whole section of Kiangsu north of the old bed of the Yellow River and east of the Grand Canal is one vast network of canals and small rivers, with their beds so little below the level of the surrounding country that only comparatively moderate rains are necessary to create floods.

The Yi River, as before mentioned, discharges into the Grand Canal. During the dry season both this river and the Shu discharge but little water and are in no sense navigable, but after rain this Yi River becomes a torrent which pours into the Canal, tearing away the western dyke (if it has been repaired since the previous floods), and flooding the country on both sides of the Canal. During the rainy season the river often rises ten or fifteen feet in twelve hours, and sweeps all before it. This torrent, loaded with silt, rushing down the Grand Canal, eats away the water face of the dykes, and eventually all the silt is deposited in the Canal and its bed raised. Consequently the Canal is to a great extent injured for navigation in the portion between Yao-wan and Sochien. The Yi River is also the principal feeder of that portion of the Canal from Yao-wan south, but this water supply is insufficient during the dry season, owing to a great extent to the fact that the water is dissipated in some five distinct channels, and during the rainy season, owing to the lack of regulating works of any description, the torrents cause much damage.

THE HUAI RIVER

The Huai River and all its tributaries as far east and including the Ke River have well-defined channels, and these channels are for the most part of sufficient capacity to handle ordinary floods. Even during the abnormal flood of 1868 and the greater one of 1911, comparatively little damage was done west of the Ke River, and no acute famine caused.

To the north of the Huai River and the Hungtze Lake the watershed extends to near the Yellow River, and much of the actual distance to the southern dyke of the Yellow River.

To the south of the Huai River and the Hungtze Lake the watershed is narrow. The ground rises sharply to the divide between the Huai and the Yangtsze, and the amount of water flowing north from this side is a negligible quantity in any general scheme of conservation.

FAMINE RELIEF WORK

Men, women, and children, were employed building and repairing dykes, the whole of the material for such purposes being carried in baskets as here depicted.

THE CRITICAL SECTION OF THE HUAI RIVER

The section of the Huai River which must receive the greatest study is that portion east of the Ke River, and the continuation of the Huai River, the Hungtze Lake.

The Huai River discharges into the Hungtze Lake, and this lake has no adequate, visible, well-defined outlet through which the vast amount of water poured into it from the west may with equal rapidity pass out of it in any direction, east or south.

The dip of the country is in general to the south-east. The southern shore of the lake is rather well defined by highlands and hills. The eastern and south-eastern shore for some forty-five miles is well defined by the Ming dyke, and to the north of this, extending towards the north-west, by the magnificent embankment of the old bed of the Yellow River.

THE MING DYKE

This dyke is some 25 feet in height, 300 feet wide at the base, and some 150 feet wide at the top. It was first built during the early part of the Ming-dynasty (1468) and of earth only. Although destroyed in parts by extraordinary floods, it was kept in comparatively good condition until large sections were swept away either just before or just after the commencement of the Ching-dynasty. The second emperor of the Ching dynasty, Kang-he (1662-1723) not only thoroughly rebuilt and repaired it, but added to its resistance to floods by facing the entire water side to a height of twelve feet with fine ashlar masonry laid in impure lime mortar almost equal to natural cement, each course being about sixteen inches in thickness, alternating headers and stretchers. The monumental work is in good condition to-day, and is a striking example of what the emperors of China once did for the good of the people and the country.

This dyke was built to protect the Grand Canal between Thsing Kiang-pu and the Yangtsze River (133 miles) from the floods of the Yellow and Huai Rivers, and thus save from absolute destruction the whole section of rich and densely populated rice country east of the Grand Canal and south of the old bed of the Yellow River, known as the Hia (Low) country.

THE GRAND CANAL

One of the most important features, both from a topographical and hydrographical standpoint in any study of the river systems of North Anhui and North Kiangsu is the Grand Canal. As shown by the map, this canal leaves the north bank of the Yangtsze opposite the city of Chinkiang, and runs for a distance of 133 miles north to Thsing Kiang-pu. Just north of this place it crosses the old bed of the Yellow River and runs in a north-westerly direction to the borders of Shantung and beyond, eventually reaching Peking.

The main object of this canal was the safe transport of tribute rice, foodstuffs and treasure from the rich lands of the south to the Imperial Court at Peking, the passage by sea from Shanghai or other ports to Tientsin, the port of Peking, in Chinese junks, being attended with much danger from both the sea

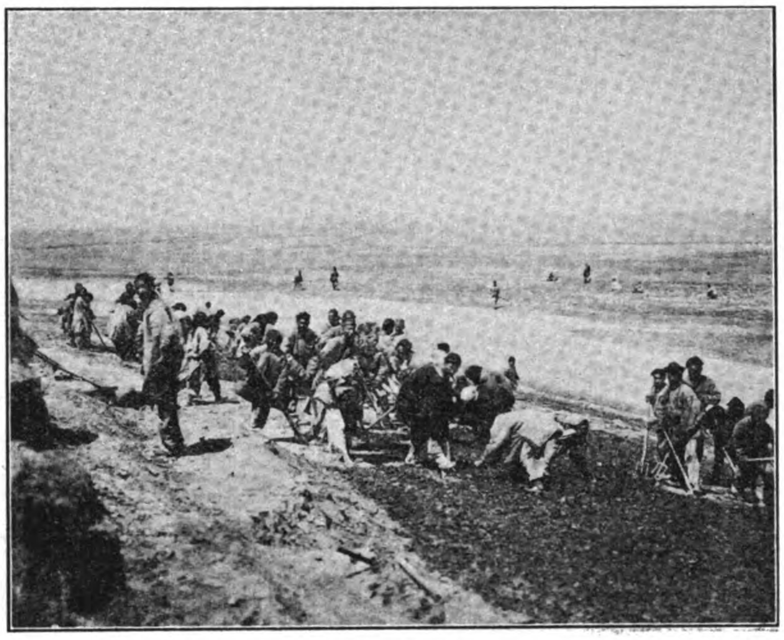
and pirates. The loss in grain, treasure and life (named in the order of their importance) was so great that the expenditure necessary to construct the canal and operate it was justifiable at the time. The present canal was completed during the Mongol dynasty, and for six hundred years afterwards, until the arrival of coast steamers and later the railways, was of great value. Even at the present date, although the through traffic to Peking has been discontinued, the canal is of immense importance as a transport route to the country through which it runs, and would well repay the cost of being put into throughly good repair and of being well maintained.

The only part of the Canal now under consideration is from the Shantung border to the Yangtsze. The width is from 200 to 400 feet and the depth from 2 to 10 feet, depending upon the locality and the time of the year with reference to the water supply. The water is confined between artificial embankments, and in much of its length not only is the surface of the water much above the level of the adjacent country, but in many parts the bed itself of the canal is so too. This difference in elevation varies from 0 to 20 feet or more, and as the Chinese up to the present time have expended all their labour in increasing the height of the dykes and none upon lowering the canal bed, the condition becomes worse each year and the danger more imminent.

The line of the canal crosses the dip of the country at a large angle, and consequently for the whole of its length from Nan Wang Chang-tcha in Shantung where the water divides, some flowing north and some south to the Yangtsze River, a distance of 500 miles, the canal with its high artificial dykes acts as a dam to all the natural outlets to the sea for the rivers having their sources on the west side, the most important of these being the Huai River.

The successful handling of the Grand Canal, in the maintenance of unbroken transport facilities, a minimum allowable depth, a carefully regulated water supply and the passing of the Huai River floods through it, is one of the most important and delicate problems of the proposed conservancy.

The canal acts as a great obstruction to the passing away of the heavy rainfall which causes the floods, the long duration of which is caused to a great extent by the canal, and reacting are the greatest source of danger to the canal and the greatest source of damage to it, being a constant menace to its dykes, which if broken on the eastern side endanger the entire usefulness of the canal, and even if the breaks do occur much of the flood waters are of necessity obliged to find an outlet through the canal, as the canal itself cuts off all other outlets; and thus each year, during the months of June, July and August at least, the canal is required to carry away an amount of water much beyond its maximum capacity. This is a source of great danger to its dykes, and even if they do not break they are likely to be badly damaged, and a great quantity of silt is deposited which necessitates the dredging of the channel (which is never done), or the increasing of the height of the dykes (which is sometimes done). As a matter of fact nothing is usually done until a serious break occurs in the dykes, much damage is done to the low (Hia) country, and valuable crops are lost with some lives, and then the repairs are made in a weak, cheap, temporary manner at a tremendous cost. With proper outlets the flood level would be lowered, the length of duration of the floods reduced, the land drained, and the danger and damage to the canal reduced to a minimum.



FAMINE RELIEF WORK

As has been before stated, the land on the east of the canal is much lower than that on the west, from the Yangtsze River to Thsing Kiang-pu, and north from Thsing Kiang-pu to about Sochien. The cause of this is that during the centuries in which the canal has been in existence it has acted as a dam to the waters coming from the north-west, and consequently the greater part of the silt brought down by these floods has deposited on the western side, gradually building up the country, the land to the east receiving only the silt carried somehow across the canal in times of excessive floods.

The Tientsin-Pukow Railway Embankment

Within the last few years a new and disturbing feature has been added to the topography of North Anhui, which requires careful study with regard to the conservancy scheme. This is the embankment of the Tientsin-Pukow Railway, which, as will be seen on the Map, extends north from Peng-pu, on the Huai River, to Suchow-fu, in the province of Honan, crossing the line of the dip of the country at an angle of 60 degrees more or less. This embankment is from ten to forty feet in height, and forms a barrier to the natural flow of water in times of flood. A most careful study of flood conditions and the amount of water to be handled was made by the Railway Engineers, and as far as could be foreseen ample openings have been made for the passage of the flood waters in such a manner as to prevent serious damage to the railway embankment, and the great floods of 1910 and 1911 passed without breaking this embankment; but whereas before its construction the flood water flowed from the north-west to the south-east in one vast sheet and the floods subsided in days, now the water having to flow south and pass through definite openings is much retarded in its subsidence, and possibly weeks are required.*

The Principal Causes of the Floods in the so-called Flood and Famine Region. The Huai River Basin.

The entire Huai River catchment area discharges its waters into the Hungtze Lake. The bed of this lake is comparatively high, and is slowly being raised each year by the deposit of silt which it receives from the Huai and the other less important rivers coming in from the north and north-west. It may be said, however, that the percentage of silt held in suspension by the flood waters of this region is small as compared with that of such rivers as the Hai ho at Tientsin, the Yellow River and the Yangtsze, but what there is is deposited in the Hungtze Lake which has no adequate outlet. The floods come from the west, north-west and north. The country has a minimum of dip and no outlet, therefore the greater part of the inundation in North Anhui is not due to the rivers overflowing their banks, but is caused by

* This statement is not made as the result of personal observation, but from data given me by foreign missionaries and natives living in sections affected.—*C.D.J.*

the backwater of the Hungtze Lake and the lower reaches of the Huai, due to the fact that neither the Huai nor the Hungtze Lake have an outlet at all in proportion to the immense amount of water which is poured into them in a short period of time.

A Short Historical Sketch of both the Yellow River and the Huai, and the Causes which led to the Present Existing Conditions

From the most ancient times of which there are reliable Chinese records, say 2000, B.C., until 1324, A.D., the Huai River had a well-defined channel and flowed freely to the sea through the Hungtze Lake by what is known to-day as the old bed of the Yellow River. The Hungtze Lake at that time covered about one quarter of its present area.

Up to 1324, A.D., the Yellow River, with one temporary exception, had its discharge to the north of the promontory of Shantung, moving its actual point of discharge up and down this coast from the borders of Shantung on the south to Tientsin on the north, at times discharging through several mouths simultaneously.

The one exception was in 1100, A.D., when it broke its southern dyke near the point now crossed by the Grand Canal, and for a short time came south more or less along the line of the present canal, spreading ruin and death in its path and discharging a portion of its flood into the Yangtsze, breaking the canal dykes south of Thsing Kiang-pu, and spreading over the low country to the east. At the same time an immense flood in the basin of the Huai added much to the horrors of that year. This diversion of the Yellow River was, however, only of a temporary character; the break in its dyke was repaired, and it was once more confined to the north.

In 1324, however, the Yellow River having completed its continent building in North China for the time being, broke its southern dyke near Kaifengfu in Honan, and once more swept south, this time from the north-west, seeking a new channel to the sea. Several were tried during the next year or two, one by the Sha River into the Huai, then by the Ke River, then for a short time by a direct channel into the Hungtze Lake, until at last it settled down to one route, joined the Huai River just north of Thsing Kiang-pu, and with it passed into the sea in the original channel of the Huai, now known as the old bed of the Yellow River.

In time the immense amount of silt brought down by the Yellow River raised the bed of this channel to the height of the Hungtze Lake and more, and the floods of the Yellow River began to back up into the lake and the Huai. As the bed of the Hungtze Lake rose, its water spread over the count.y more and more, to the destruction of cities and towns on the northern and southern shores. Some of these cities were moved to more elevated sites, and others simply went out of commission.

The beds of the Hungtze Lake and Yellow River continued to rise, and the floods of the latter swept west as backwater in a most dangerous manner. The floods of the Huai were small compared with those of the Yellow River which must be controlled and confined. If it once forced its way into the country south of Thsing Kiang-pu it would mean the destruction of the Grand Canal from Thsing Kiang-pu

DYKE BUILDING

A huge circular stone is hoisted by means of ropes by a number of men and does effective tamping work

south, and the utter ruin of the rich and densely populated low country south of Thsing Kiang-pu and east of the Grand Canal. Consequently the dykes of the Yellow River were greatly increased in height and thickness and faced with cut stone for some hundreds of miles, the famous Ming dyke was built, and the Huai River flowing into the Hungtze Lake was cut off from its direct outlet to the sea, and left to get out of the Hungtze Lake as best it could. The result of th's is that when the heavy rains come the Huai has no way of passing them quickly on, and the water is held in the Hungtze Lake and backs up, flooding the country to the north-west. In time it passes away, partly by exfiltration in the Hungtze Lake and the swamp lands to the south-east, partly by evaporation, and partly through numerous small channels in the vicinity of Tsiang Kia-pa, leading east to the impassable barrier of the Grand Canal, and then south through the swamps and shallow lakes into the Yangtsze. A certain amount also passes directly into the Grand Canal by the Ching River.

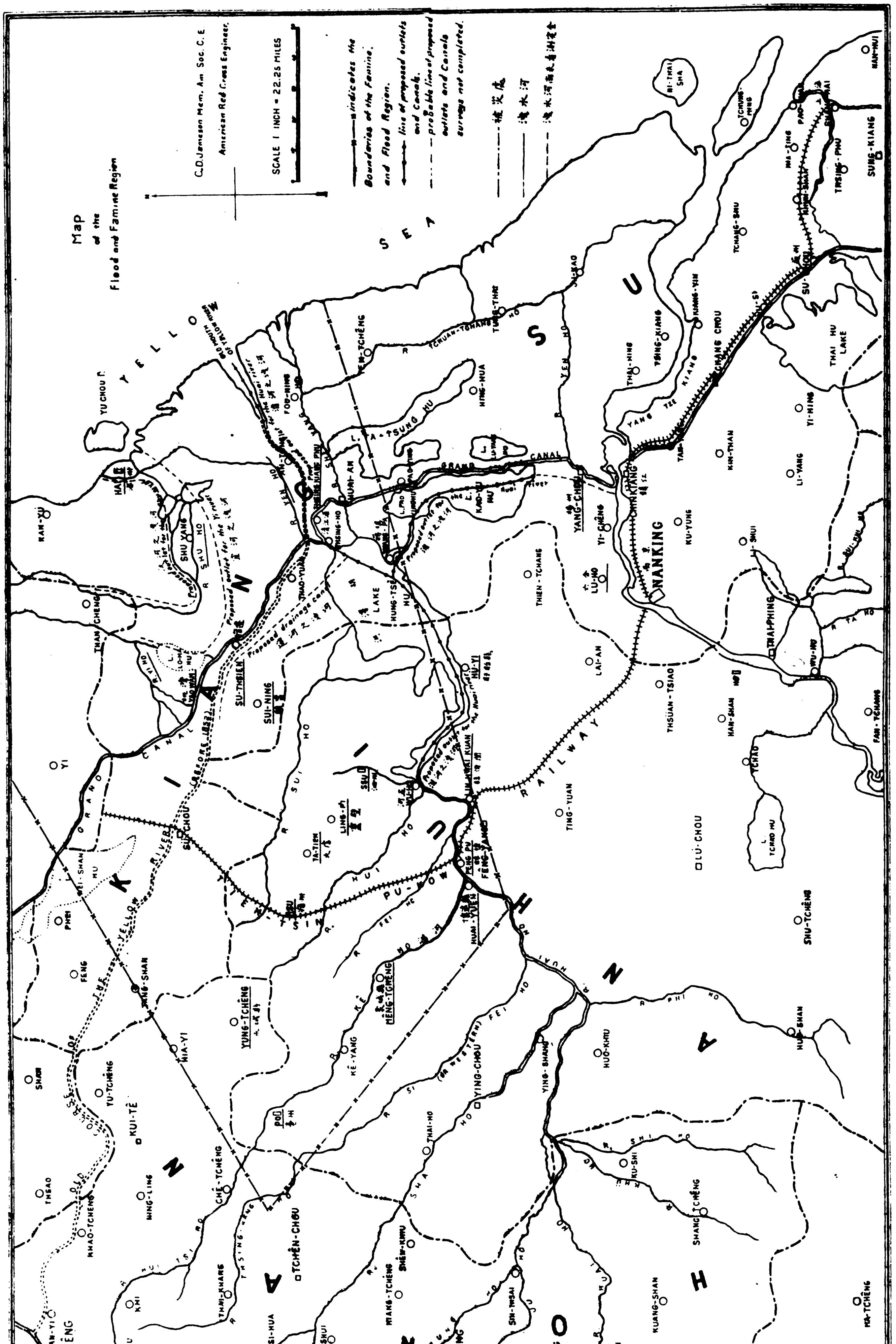
The amount of water to be handled is so great that often the waters of one flood cannot pass away before the arrival of the next year's flood, and the average now is that the flood areas of Anhui are inundated at least three years out of five.

In 1854 the Yellow River once more went north of Shantung, after 530 years of hard work in the south, but its enormous dyke and raised bed still present an unsurmountable barrier to the free passage of the Huai River to the sea, and the high floods still continue.

In 1854, when the Yellow River changed its course once more to the south, the Taiping Rebellion was in full swing, and was laying waste the Empire south of the Yangtsze, and in many places to the north. The Imperial forces from the north were being hurried towards the south to stop the advance of the rebels. There were no railways. To meet the rebels the northern troops must come down the Grand Canal or march overland. The north dyke of the Yellow River to the west of Kaifengfu gave way, and the Yellow River poured its torrent of mud and water into this north country from the break to the sea. The Grand Canal was thus rendered useless, and from the mountains on the west to the sea was a barrier through which no troops or munitions of war could pass either way for some two years. There was much written at that time to prove that either the Taipings or Manchus cut the dyke in order to prevent the moving of troops either north or south, by land or canal. A search through these documents proves nothing either way, but certainly the dyke gave way, the country was inundated and no troops could pass, and all at a most opportune time.

The Water Supply of the Grand Canal and the Outlets of the Hungtze Lake

The main water supply of that section of the Grand Canal south of the border of Shantung and north of Thsing Kiang-pu comes from the Yi River. As has been said before, this supply is most irregular in amount. During the dry season, from November to May, the


Map
of the
Flood and Famine Region
C. D. Jameson Mem. Am. Soc. C. E.
American Red Cross Engineer.
SCALE 1 INCH = 22.25 MILES
indicates the Boundaries of the Famine and Flood Region.
line of proposed outlets and Canals.
probable line of proposed outlets and Canals surveys not completed.
YELLOW SEA
KIANGSU
NGANHWEI
HONAN
NANKING
CHINKIANG
YANG-CHOU
HAI-CHOU
SUN-KIANG
SU-CHOU
THAI HU LAKE
YANG TZE KIANG
GRAND CANAL
HUNG-TSE HU LAKE
HWAI HO
PU-KOW RAILWAY
TIENTSIN PU-KOW RAILWAY
OLD COURSE OF THE YELLOW RIVER
KHAI-FÊNG
TCHÊN-CHOU
YING-CHOU
FENG-YANG
HUAI-YUEN
SU-THSIEN
SUI-NING
WU-HU
THAI-PHING
LU-CHOU
THAI-HU

Yi River discharges but little water, not sufficient to keep the canal at a desirable depth. For a part of the time the larger cargo boats are unable to run, and even the smaller boats have to move slowly and with care, seeking the devious, narrow channel and avoiding the bars and shallows.

Much of the difficulty of navigation during the dry season is not due to the actual lack of water but to the entire neglect of any regularization of the channel, either as to uniform slope of the bottom or uniform cross section, and absolutely no work of repair or training has been attempted for years.

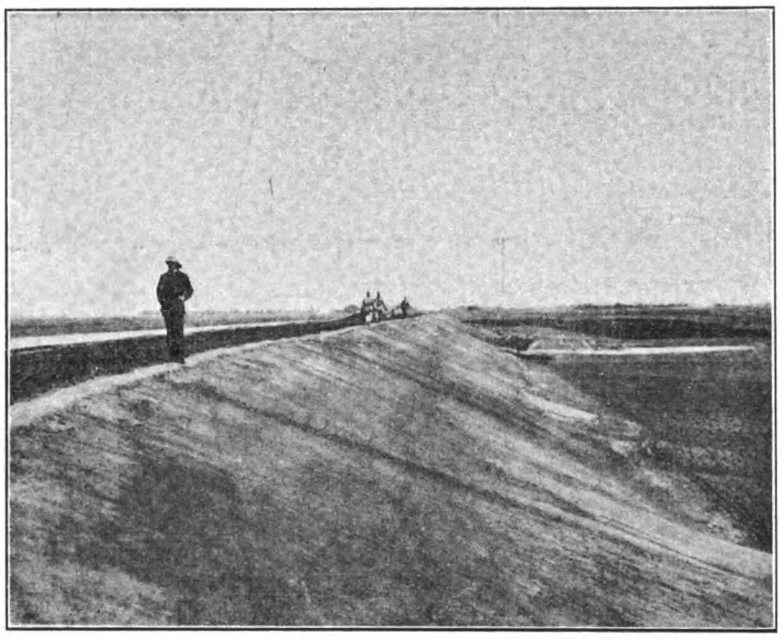
When the Yi River is in flood there is a superabundance of water: the channel changes from day to day, scour and deposit take place where they will, the dykes are broken or at least very much damaged, and in places the water spreads out to a thousand feet or a mile in width; the waste sluices on the east side are opened, and if these are not sufficient to control the flood the "pas" are broken away and the country to the east is flooded. A "pa," as the word is used here, is a section of the dyke constructed, not of well tamped sand and clay, but of millet stalks tied in bundles, and laid at right angles to the axis of the canal. These "pa" were originally fifty or a hundred feet in length, and in the low country to the east there was, at least in theory, a suitable canal to receive the water. When the flood reaches a certain height and is still rising, in spite of the fact that all the permanent waste sluices are open, a few bundles of the millet stalks are removed from the centre of the "pa" to a depth sufficient to allow a small opening for the water which quickly does the rest. The entire temporary bank is speedily torn out, usually with some hundreds of feet of the permanent dyke on each side of it as well, the water pours into the low country, and the canal, to a certain extent, is saved. Saved, however, at the expense of the low country, as any channels which may once have existed to receive the overflow have long since silted up.

When the flood subsides and the banks and "pa" are repaired, millet stalks alone are used, being much cheaper than a well built dyke of earth, and the consequence is that some of the "pas" are now a thousand feet in length and are carried away by very moderate floods, to the great damage of the low country and to the canal itself.

The northern section of the canal may be said to finish near Yang-suan and the southern section to commence south of the lock at Thsing Kiang-pu. That section of the canal between these two points may be considered a regulating section for the regulation of the amount of water to be admitted to the southern section of the canal. Both north and south of Yang-suan are waste sluices which discharge into the Yen-ho, which in turn discharges into the sea beyond Haichow.

The Yen River, or, to give it its full Chinese name, the "River for the transport of salt," is not a river but an artificial canal constructed for the transport of salt from the sea coast to Yang-suan in small boats, at which point it is transhipped into large boats, some of which are sent north up the canal, and many across the Hungtze Lake and up the Huai River, to be distributed through the entire Huai basin.

Near Matou is the so-called Thsing River, branching off from the canal and running either to or from the Hungtze Lake according as to whether the water level of the lake is lower or higher than the water level of the canal. There is a dam across the Thsing River of such a height that normally it is submerged and the waters of the canal or lake pass freely over it, but in the case of extreme low water in the lake this dam is of sufficient height to prevent the draining of the canal below a minimum level.



A COMPLETED DYKE

Beyond the opening of the Thsing River towards Thsing Kiang-pu are three so-called locks, situated about a mile apart, and at Thsing Kiang-pu is another lock. The three sluices have a clear opening of only 23 feet in width. Vertical grooves are cut in the masonry for the reception of timber balks, by means of which the water level in the pools below them may be raised some seven feet above low water, thus creating sufficient depth of slack water for the passage of cargo boats, and also when necessary for the closing of the canal to excessive overflows from the Hungtze Lake through the Thsing River when the lake is in flood. Through these locks passes all the water from the Hungtze Lake and the Huai River which finds its way into the Grand Canal, though they have openings of only 23 feet in width, and in flood time a depth of water not exceeding ten feet.

The canal from Thsing Kiang-pu south is amply provided with waste sluices in the east dyke for the passage of any excessive amount of water.

Tsiang Kia Pa.

The Grand Canal cannot in any way be considered an outlet for the waters of the Huai River and the Hungtze Lake. The real outlet of the Hungtze Lake and consequently of the Huai River is through the so-called five canals from Tsiang Kia pa on the south-east side of the Hungtze Lake, running east to the marshes and lakes extending south to the Yangtsze River along the west side of the Grand Canal. These canals are some 500 feet in width and 8 feet in depth, and as defined canals they are only some six miles long, extending from the lake east. At this point they merge into shallow lakes and marshes, and only a small clear channel is maintained at Tsiang Kia pa on the lake. Four of these canals are closed by earth dams, and except during the excessive floods all the water carried off at this point passes through one of these canals. In times of excessive floods the four dams are cut successively, and as many of the canals used as are found necessary. During the dry season the water level of the lake falls to such an extent that an earth dam is built across the entrance to the canal usually kept open, to prevent the water of the lakes and marshes from draining into the the lake, as it is advisable to maintain a sufficient depth in this canal to allow of the passage of boats to and from the Hungtze Lake. The passage is effected by the opening of a moveable section built into the earth dam, and pulling the boat up the incline of water from the lake by means of ropes or windlasses, or allowing it to slide down into the lake, in the same manner as boats pass the locks in the canal north of Thsing Kiang-pu.

The Floods in the Section North of the Old Bed of the Yellow River and East of the Grand Canal.

This section extends from the sea to the dykes of the Grand Canal, and from the north dyke of the old bed of the

Yellow River to the hills and mountains of southern Shantung, the Grand Canal cutting off all the waters coming from the west, with the exception of the waste waters of the Canal itself.

The river systems are the Shu and Yi, which have already been described. These both come from the north, having their sources in the mountains of southern Shantung. The Shu discharges all of its waters into this flat plain, the Yi all of the water not used to feed the Grand Canal. In addition to these two natural rivers there is the artificial canal, the Yen River, running from the point north of the old bed of the Yellow River near where it is crossed by the Grand Canal to the sea beyond Haichow in the north-east, a distance of 100 miles. The Lui-tang-ho crosses the Yen-ho at Pampu, flowing eastward to the sea. This whole section is a network of canals, crossing and recrossing in every direction. Which are artificial and which natural it is now impossible to determine. The tide from the sea comes up all of these waterways for a distance of some fifteen or eighteen miles. None of these waterways receives any care, and judging by appearances and available local information the channels are never cleaned out.

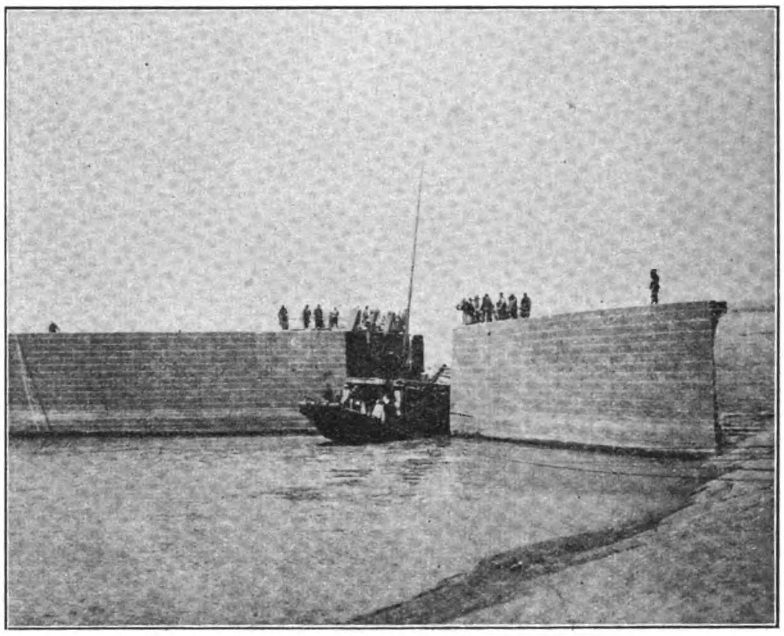
As is always the case with waterways through an alluvial country, the lower-reaches are silted up, and in many cases the bed at the lower end is higher than in the intermediate sections. This is clearly shown on the profile of the Yen-ho, where the bed near the sea is some six feet higher than the bed fifty miles further up the river. This is also shown on the profile of the Lui-tang-ho.

This silt deposit is also greatly accelerated by the action of the tide, the incoming tide having the effect of creating slack water or a slight reverse flow, giving the fresh water a chance to free itself of much of its burden of silt, while the ebb tide does not create a velocity of discharge sufficient to scour the bed, pick up this deposited silt and carry it on to the sea.

The water level is but a few feet below the natural surface, and the floods of the Shu and the local rainfall cover the whole northern section. The flood waters of the Yi escaping into the old bed of the Loma Lake, flooding that, and the flood waste from the canal to the east, with the local rainfall, completing the flooding of the region to the old bed of the Yellow River.

The greater portion of this flood is due to the fact that no defined outlets with adequate points of discharge have been provided by nature, and no artificial remedy of this apparent oversight of nature has as yet been systematically attempted by man.

This apparent oversight of nature is really no oversight at all, if we consider that the object of the work being done by these natural forces is to build up the country by means of silt deposits. The whole area which has been under examination is an unfinished country. All the natural forces are hard at work building it up to a point when it will be habitable for man without artificial restraint being put upon the natural forces. But man would not wait until nature had finished her work. He moved in and took possession several ages too soon, before there was a well drained cellar, before the floors were laid above the water level and even before the roof was finished. The result is that if man will move into an unfinished section with all its discomforts he must make the best of it, and pit his intellect against nature, tame these forces and make them work for him.



GRAND CANAL LOCK

This lock is one of the outlets of the Huai River at Thsiang-kiang-pu, the passage way being 23 feet wide

PART II

A Description of the Work to be done to lower the Flood Level and Drain the Marshlands and Shallow Lakes in the Flood and Famine Region of the Northern Portions of the Provinces of North Anhui and North Kiangsu.

It must be understood in all that is said in this Report as to the lowering of the flood level and the practical elimination of the floods, that it applies to normal floods, such floods as occur every few years, or year after year in some cases, destroying the crops and impoverishing the people. Such floods, and consequently the damage done by them may be done away with, but at times there comes an abnormal flood or cataclysm, which sweeps before it any work of man. Such floods cannot be eliminated, but there is always the chance that such horrors may never arrive.

The Yellow River

It may be remembered that amongst such monstrous calamaties must be reckoned the possible breaking of the southern dyke of the Yellow River and the pouring of its devastating floods of mud and water over the region under consideration. If this break should occur and the Yellow River once more come south of Shantung, the conditions governing the conservation system of this region would be radically changed, and after the immediate deluge was over there would be entirely new problems to solve.

The Sea Coast from the old Bed of the Yellow River to Haichow.

As all the waste waters of the area north of the old bed of the Yellow River and east of the Grand Canal, together with much of the discharge of the Huai River must eventually flow into the sea at various points between the old mouth of the Yellow River and Haichow, one of the most important and one of the first pieces of work to be done is a complete survey of this section of the sea coast, the survey to be both topographical and hydrographical.

At present no charts of any value exist of this section, and none on which the soundings are correct. All sandbars, shoals, etc., shown upon existing charts of this coast are either works of the imagination, or any actual soundings recorded were taken so many years ago that nothing can be said of them beyond the fact that they are known to be incorrect at present. Of course the great reason that no accurate charts exist of this portion of the coast of China is due to the fact that there are no harbours available for sea-going vessels, and that the coasting steamers plying between existing ports such as Shanghai and the ports to the north, follow the shortest routes, and thus pass many miles to the east.

A chart should be made of this coast showing the depth of water, direction and force of any ocean currents, direction of prevailing winds, drift of the sand, rise and fall of the tides, etc., etc. This work should or might be done by

the Coast Survey Department of the Chinese Maritime Customs, and they would undoubtedly undertake it if the value and necessity of the work were officially brought to the notice of the Inspector General.

The object of this survey would be to make possible the selection of the most suitable points for the discharge of the waters which now flood the back country.

This entire area is an unbroken alluvial plain, and the cost of constructing new channels to the sea or enlarging any of the existing ones would be practically the same wherever located; therefore in locating these channels the question of difference in cost may be eliminated.

The great point, and practically the only essential point upon which too much study and care cannot be expended, is the location of the points where these channels shall discharge into the sea, the best location being at those points where the configuration of the coast, the prevailing winds, the existing currents and the depth of water all combine to allow of the maximum discharge of water with a minimum cost of artificial works and a minimum cost of maintenance. These questions cannot be answered until the coast, both land and water, has been thoroughly surveyed, and all this necessary information is available.

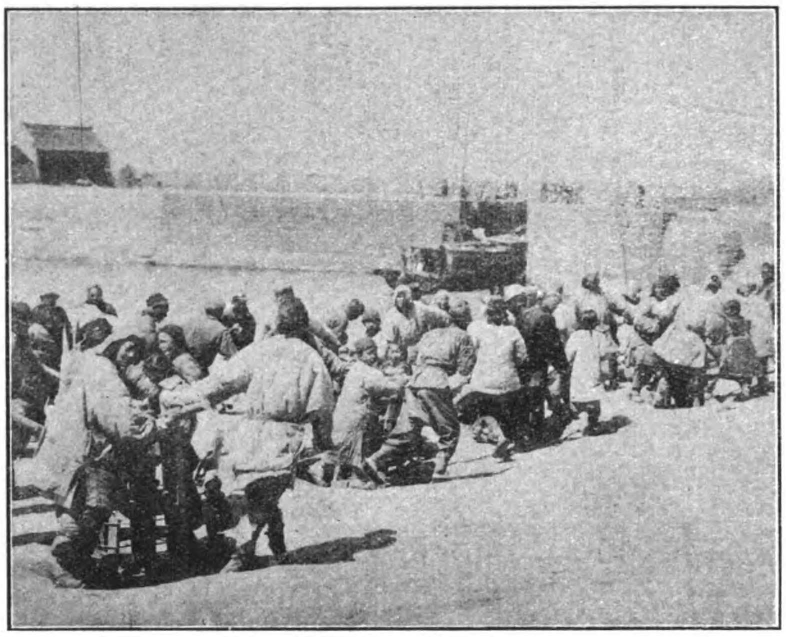
The more water that can be discharged at these selected points the less there will remain to be taken care of by other and more expensive means, and the less will be the initial cost of the drainage and conservancy work, and the less will be the cost of maintenance.

The Shu River

This is a flood river discharging but little water during the dry season, but much in a very short time during the rainy season. No records of the actual discharge will be available until November, 1912. After leaving the mountains of Shantung and reaching the alluvial plain, this river has now one well defined channel to the sea, but many indefinite ones. The water is divided and spread out to such an extent that it has not sufficient velocity to keep a channel clean. The channels are more or less blocked by the growth of aquatic plants, which tend to retard the flow of water, spread it over the country, and year by year increase the marsh sections. Some definite channel to the sea should be selected, the shorter the better, other conditions being equal, and this channel cleaned, deepened and made of sufficiently large uniform cross section. The channel should be excavated below the level of the country, and whether or not it should be protected by dykes is a question for further study. All side outlets or inlets should be protected by regulating sluices, so constructed as to cut off all flow of water either way when necessary, these outlets or inlets being used either to drain the adjacent land or irrigate it according as the necessity might arise.

The river need not be considered from a navigable point of view, as it is only used by small boats during a few months of the year. As the water is low in the river the greater part of the year, some inexpensive form of moveable dam may be necessary to raise the water level sufficiently for irrigation.

If flood dykes are necessary the flood channel need not be cut much, if any, below the surface of the country. The dry season channel should, however, be cut well below the surface level and kept midway between the flood dykes.



WORKING A LOCK

This view illustrates the method adopted to haul a Junk through a lock. Wire ropes are attached to the Junk and are wound on windlasses by the country people

In no case should it be allowed to impinge upon them and wherever a tendency is shown by the channel to work towards either dyke it should be stopped at once, and if taken at the start a river can usually be trained to hold its proper course at comparatively little expense. The great reason why the low water channel should be kept away from the dykes is that when a rise begins, and before the low water channel is overflowed, the water being confined and relatively deeper has greater velocity, and is capable of doing more damage. As the water rises and spreads out to the flood dykes the velocity decreases at the sides, and is less when the dykes are reached, increasing, however, as the depth increases; but by this time the water is above the toe of the dykes where the greatest danger of damage is, and the flood may be controlled with a minimum of danger to the dykes.

The Yi River

The problem of the Yi River is entirely different from that of the Shu.

The Yi River rises in the mountains of Shantung, and after reaching the alluvial plain of North Kiangsu divides into some five channels, all of which discharge into the Grand Canal, the most southern of these points of discharge being at the village of Yao-wan. This is a flood river similar to the Shu, but unlike the Shu it is an important feeder of the Grand Canal, and thus becomes an important factor in the maintenance of the Canal.

At present its floods are in no way controlled and do much damage each year, flooding large areas in the Pichow district, causing the loss of crops and also destroying the dykes of the canals in many places. This breaking of the dykes tends much towards lowering the water level in the canal during the dry season, much to the detriment of navigation. The bottom of the canal is not above the surface level, but when the dykes are in repair the water level is often higher than the swamp lands to the west.

The only outlet for the Yi under normal or low flood conditions is the Grand Canal, with the result that the western dyke of the canal is broken in many places, and the flood waters sweep across the canal and into the marshland beyond.

With heavy rains in the mountains of Shantung the river rises with great rapidity. In October, 1911, the river then running half full rose over twelve feet in a few hours, and flooded the village of Yao-wan. The western dyke gave way, and the country on both sides of the canal was flooded for miles, both north and south of Yao-wan, and many persons were drowned.

When the water has reached a certain height a small amount of relief is given by an overflow into the old and now normally dry bed of the Loma Lake, lying to the south and west of Yao-wan. This old lake bed is some ten miles wide east and west, and fifteen north and south. At one time it was a depression receiving the water of the Yi and discharging to the south, probably for some distance along the line of the present canal. The bed of the Loma Lake was gradually raised by silt deposits and is now dry, excepting in high floods of the Yi, when a portion of

the water passes into it through a small but ill defined channel.

To do away with the flood evils of the Yi River the following work should be done:—

A well defined channel for the Yi should be cut through the Loma Lake bed and continued to the sea, probably by the enlargement of some existing channel. This channel through the lake bed should be kept as high near the side of the basin as is compatible with sufficient fall to carry away the water, in order to be of use for irrigation when necessary.

Whether the five channels by which the Yi now discharges into the Grand Canal should all be maintained or not is a question to be determined after a more detailed study and survey have been made of the existing conditions than has yet been possible. This future study of the conditions, however, will only determine what outlets are necessary for the proper irrigation of the section through which they pass, and the proper supplying of the canal with water. But whatever number of outlets are found necessary, each of these outlets should have a regulating headwork at the point where it leaves the main river. There should also be a regulating headwork across the flood canal through the Loma Lake at the point where it leaves the main river, and also one across the main river just below the opening into the flood canal.

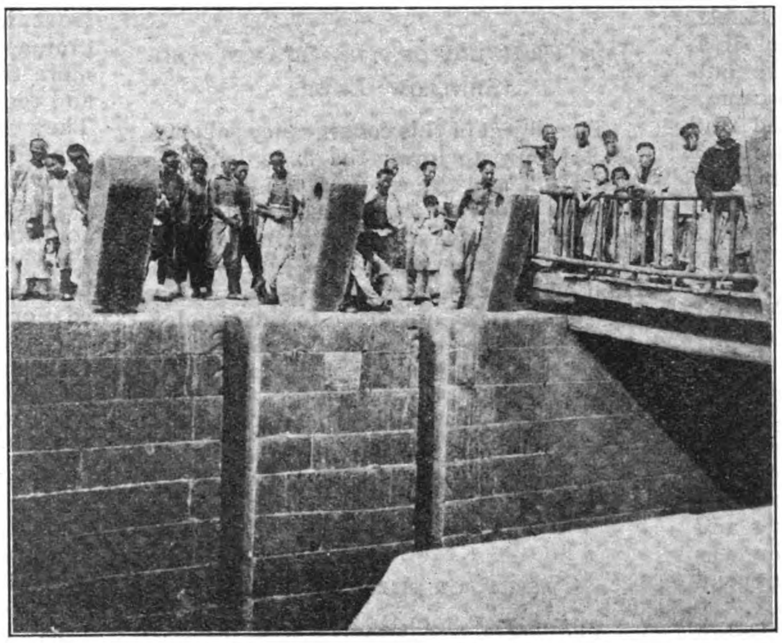
These headworks should be worked as follows:—

During the dry season the channel to the Loma Lake should be kept closed, unless it be deemed advisable to pass a certain amount of water down it for irrigation purposes. The water passing into the Grand Canal for the purpose of maintaining its water level could pass through any or all of the outlets, the continued maintenance of which a careful study of the conditions had shown to be advisable. The maintenance of some of these outlet channels into the Grand Canal would depend upon the needs of the section for irrigation, and if but a small amount of irrigation is necessary there would be but one river channel, with the others merely irrigation ditches having small regulating sluices. But however the details may work out upon a careful study of the conditions, the result will be that during the dry season all the available water can be utilised when and where it is most needed with a minimum of waste, and during the rainy season the sluices to the Loma Lake can be thrown open and the greater proportion of the water passed out that way, and by means of the regulating works at the inlets of the channels leading at the Grand Canal no more than the desired amount of water will reach the Grand Canal, and thus the breaking of the canal dykes and the flooding of the country will be done away with.

The Loma Lake channel should be made of ample section and cut well below the surface level. With a properly designed channel through this lake with an ample free outlet to the sea there will be but little danger of serious floods.

All of these channels must be well maintained, kept clean, clear of vegetation, with well defined banks and uniform cross section. The water should be confined and not permitted to spread over the country, making the land sodden, and tending each year to increase the area of the shallow lakes and marshes.

With well defined outlets to the sea, the water level of this whole section north of the old bed of the Yellow River and east of the Grand Canal can be lowered to such an extent by judicious ditching as to make possible two crops each year, this ditching to be done by and at the expense of the landowners, but entirely under the direction of the Chief Engineer of the Conservancy Board.



A GRAND CANAL LOCK

The grooves in which the timber baulks are placed to raise the water are here well shown

The Huai River and the Hungtze Lake

The Huai River and the Hungtze Lake will be considered as one in the general scheme of conservancy and reclamation.

The Huai River rises in the mountains of Honan and discharges into the Hungtze Lake. Its tributaries and catchment basin have been described. The two most important tributaries, the Sha and the Ke have their sources near the Yellow River, the Sha to the west of Khaifeng-fu, the capital of Honan, and the Ke to the east of it. Both of these rivers have a navigable depth of about two feet to within about thirty miles of Khaifeng-fu. From this point the land is one large marsh, traversed by many small indefinite channels. The waters of these rivers, even in extreme floods, carry but little silt, and aid but little in continent building. The Huai, itself coming from the far off mountains of Honan, contains much more silt than these rivers, but still very little when compared with the Yangtsze and the Yellow Rivers.

Discharge of the Huai River

On the south-west side of Huai-yuan there are two considerable mountains between which the Huai River passes. To the west of this pass is a long stretch of flat country with mountains and highlands to the south, and very gently rising land to the north. Across this stretch of some six miles in length the river has a most winding channel which about doubles its length. With any considerable rise the whole section is flooded and the wheat crop lost. Much of this flooding can be done away with by straightening and confining the channel. As it is, however, there are no hamlets in this section, the whole of it being in the hands of large landowners. Therefore the loss, when it occurs, is only that of the crops, and small farmers and small villagers are not affected.

From Huai-yuan east is that portion of the Huai River requiring the greater part of the work of improvement and regulation.

The Huai, discharging into the Hungtze Lake, which has no adequate and definite outlet, cannot dispose of its waters with the rapidity with which these waters come down from the north and west during the rainy season.

The first problem, therefore, to be solved in any betterment scheme for the Hungtze Lake and the Huai River is the providing of one or more adequate outlets for the lake.

There are two possible directions in which the waters of the lake may be drained. It may discharge into the sea to the east or into the Yangtsze River to the south. Owing to the great discharge of the Huai during the floods it has been considered wise to utilise both of the possible points of ultimate discharge.

The outlet to the east would leave the lake at or near the mouth of the Thsing River. The actual location of the ocean mouth cannot be decided upon until the hydrographical survey of the coast has been made, but under no circumstances should the channel of this new outlet be located south of the old bed of the Yellow River.

The reasons are:—

(*a*) That the country south of the old bed of the Yellow River and east of the Grand Canal is lower than the land either to the north or west, and has a lesser rate of fall to the sea.

(*b*) This entire section is densely populated and brought to a high state of cultivation, being one of the richest agricultural sections of China.

It being much lower than the country to the north and west it is always on the verge of destruction and ruin from inundation. Its defences, with the greatest care and watchfulness, are only just able to avert disaster from the many forces which now threaten it, and the opening up of a new channel through it of sufficient capacity to carry one half of the great flood discharge of the Huai, would add a tremendous menace to the future of this section.

It must be remembered, however, in designing and executing and protective work against floods, that some cataclysmic flood may come which no justifiable work of man can withstand, and if a new channel for the Huai were cut through this section and the crash came, the loss of life and property would run into millions, taels and human lives; therefore almost any increased amount in the cost of the work would be justifiable to keep the proposed new channel in or north of the old bed of the Yellow River.

Even if in years to come the Yellow River shifts its channel once more to the south of Shantung by a break either near Khaifeng-fu or near where it is now crossed by the Grand Canal, there is a strong possibility that the resulting deluge would get to the sea without breaking into the low (Hia) country, the old dykes of the Yellow River and the Ming embankment serving as buttresses against which it might expend its fury in vain.

The country north of the old bed of the Yellow River and east of the Grand Canal is also a low, flat country, full of canals and watercourses. From the north it receives and will continue to receive all the flood water of the Shu River, and when the conservancy work is completed there will be a large addition to the flood waters of the Yi River. These, with the water due to its own rainfall will give it about all the water it can get rid of. Therefore, unless it is absolutely necessary, no more water should be added to this region.

For all of the above given reasons the turning of the floods of the Huai River into the low country, either to the north or to the south of the old bed of the Yellow River would be a grave error, if some other channel is available. The one available, and in many ways most desirable, is the old bed of the Yellow River itself. The gigantic dykes which would serve as flood dykes are still in existence and in fairly good condition. Between the dykes the surface level is considerably above the surface of the adjacent country, thus making possible the excavation of the entire channel for the Huai River, below the land surface. All the land between these dykes is Government property, thus eliminating the cost of purchasing new land for a right of way, and all troubles with native landowners. The width between these old dykes is so great that even in the event of abnormal floods the water could not inundate the country.

The conditions of the old mouth of the Yellow River at the sea will not be known until the results of the hydrographical survey are available. There is, of course, the possibility that during the last fifty-eight years the ocean currents may have swept away much of the deposit of the Yellow River. However, it is not absolutely necessary to use this old mouth, as the new channel, when near the sea, can pass through the old dyke to the north and discharge into the sea at any desired point.

The Draining of the Swamps and Shallow Lakes

The object of this conservancy scheme is not only to lower the flood level of the Huai and the whole north country, but also to drain the thousands of acres of land now swamps and shallow lakes. These thousands of acres of exceedingly rich land are now not only useless as far as any returns are made to the people, but are worse than useless in the barrier they form to the rapid subsidence of the floods, and cause an annual increase in the acreage of swamp lands.

The Lakes and Swamps West of the Grand Canal and South of Thsing Kiang-Pu and the Third Outlet for the Huai River.

The lakes and swamps west of the Grand Canal and to the south of Thsing Kiang-pu, together with the second outlet for the Hungtze Lake and the Huai River will now be considered.

Other than through the small locks into the Grand Canal north of Thsing Kiang-pu, the only present outlet for the Hungtze Lake consists of the five artificial, so-called canals, all more or less well defined, starting from the south-east corner of the lake at Tsiang Kia-pa and running east through swamps to the lakes extending south three-quarters of the way to the Yangtsze, on the west of the Grand Canal, the Pao Ying-hu, Kao-yu-hu, Shao-pu-hu, etc. An ample canal should be made from the lake at Tsiang Kia-pa towards the east, then swinging round to the south and connecting all these lakes, with an ample outlet into the Yangtsze. The depth of the canal should of necessity be such that not only would it serve as an additional outlet for the Hungtze Lake and the Huai River, but it would drain these smaller lakes and all the contiguous swamps and marshes, thus making available for agriculture not only thousands of acres of rich land now useless, but also insuring a regularity of crops on thousands more acres by proper drainage and elimination of floods.

As these lakes, the Kao-yu-hu, etc., are on a level with the canal at its southern portion and in connection with it, their partial or complete drainage and the lowering of the water level of the section will necessitate changes in this portion of the Grand Canal itself.

The Draining of the Country North of the Huai River: Yung-tcheng, Nan-Suchow, Ling-pi, Sze-chow and Suchow-fu.

There are no large rivers in this section, but a sufficient number of small ones to amply drain the country if the channels were properly cleaned and regulated, and suitable outlets provided for them. No heavy and expensive work would be required here for the drainage of this section. What is needed more than anything else is the cleaning and regulating of the existing channels. They have all become more of less choked with water plants, the dykes have broken in many places, and with a small rise the water spreads over the country in shallow lakes instead of running off in a proper channel; the ground becomes sodden, seed cannot be planted nor the ground utilised in any way. The result of this is that the marsh land is increasing in area each year, overgrown with rushes and marsh vegetation. The local rainfalls, which are often very heavy, cannot run off, and must simply sink into the ground or pass away by evaporation. This process is so slow, however, that the water of one rainy season is often still on the ground when the rains of the following year arrive.

All of these channels should be thoroughly cleaned and regulated throughout their entire length and in many places straightened, the dykes rapaired, an ample outlet provided and the rivers confined to their proper channels.

After the main work of the conservancy, this secondary work should be laid out by the Engineer in charge of the section, and much of it should be carried out by the local gentry at the cost of the towns and areas benefited. All reeds should be cut on the marshes to let in the sun and wind, with the exception of sufficient reeds actually needed for fuel.

With but little heavy work this entire section of country can be well drained, the outlet being in the lower reach of the Huai somewhere east of Wu-ho, the Kui, Pa-kou and Wei Rivers being made the main arteries of the system, and possibly the channel of the Sui River may be utilised. None of the water of this region should be allowed to flow east to the Suining and Sochien

districts, but should be turned south into the Hungtze Lake or the Huai River.

THE LAKES AND SWAMPS WEST OF THE GRAND CANAL AND NORTH OF THE HUNGTZE LAKE.

All of the lakes swamps west of and more or less adjunct to the Grand Canal as far north as the Shantung border should be connected with definite, clean adequate channels, and drain into the Hungtze Lake from the north.

The canals for draining the swamps and lakes of this region will not require large cross sections, as they will not be used for navigation other than by very small boats.

It must be remembered that all the canals for the drainage of this section must be cut well below the surface of the ground, that the channe's must be well defined and as straight as possible, the banks properly guarded by dykes where necessary, and the channels kept clean and of uniform section, when the passage of the water itself after rain will cause sufficient erosion to keep them so.

THE SZECHOW AND WU-HO REGION.

From Szechow south flows a small river navigable by ordinary native boats for the greater part of the year. The source of this river is considerably to the north and west of Szechow, and is probably near the channel of the Pa-kou-ho north of Ling-pi. It might be desirable to utilise this small river, which on the map goes by the name of Tho-ho, as a channel for the Pa-kou-ho and the Sui-hi into the Hungtze Lake, through the lower reaches of the Huai River. The channel would require straightening and cleaning. At present this river near its outlet turns sharply to the west, runs six or seven miles, and passes into the Huai River at Wu-ho. There is a small channel near the elbow through which a certain amount of high flood water passes to the south-east and into the lower reaches of the Huai River, some ten miles west of Wu-ho. This channel could be enlarged and made the main channel for the outlet of the river. By so doing not only would the fall in the river be increased and consequently the channel made more easy of regulation, but it would afford drainage for many thousands of acres of land north, east and west of Wu-ho, which is now under water some seven months each year.

This concludes the general design for the lowering of the flood level, the drainage, reclamation and betterment of the so-called Flood and Famine Region of North Anhui and North Kiangsu, viz :—

The Shu and Yi River systems.
The Huai River system.
The Hungtze Lake

and the drainage of the swamps and shallow lakes in this region, including the lakes and marshes west of and adjacent to the Grand Canal, from the southern border of the province of Shantung to the Yangtsze River.

The Hungtze Lake is to have an outlet towards the east, approximately along the line of the Thsing River, and down the old bed of the Yellow River to the sea, the actual point of discharge into the sea to be located after the hydrographical survey of the coast has been made.

The second outlet will be east through the Tsiang Kia-pa, then south through the lakes Pao-ying, Kao-yu, Shao-po, etc., to the Yangtsze, the whole section under consideration, with the exception of the Shu and Yi River systems, draining into the Hungtze Lake.

Of the two new outlets of the Hungtze Lake that to the sea in the old bed of the Yellow River will be practically all new work. The outlets through Tsiang Kia-pa and the lakes to the south will be small channels connecting these large bodies of water, and the primary object of all these canals will be to carry away quickly all the flood waters of the Huai River system and the section north of the Hungtze Lake. This flood water comes from the west down the Huai River, and also from the north-west from the Khaifeng-fu region, and as far north as the present bed of the Yellow River, reaching the Huai through to the Sha and Ke Rivers or the Hungtze Lake, through the Wei, Fei, Pakou and other small rivers.

EAST AND WEST FLOOD CANALS.

In the time of abnormal floods it is found that the cause is often a heavy rainfall in the mountains of Honan and in the section north of the Huai River simultaneously, and that the water coming from the north and from the west is all poured into the critical section of the Huai at the same time, thus causing much flooding and damage. In order to obviate this to some extent, that is to prevent the flood from the west and flood and from the north reaching the Huai River east of Huai-yuan at the same time, a canal may be necessary, running more or less east or west, beginning at some point east of Tchen, passing to the north of Ku-yang and carried east until it discharges into Hungtze Lake or the lower reaches of the Huai River. This canal would cross all the watercourses in this region, and should have sufficient fall to carry the water coming into it from the north to the Hungtze Lake.

The effect of this canal would be as follows. Supposing a flood to come from the west and from the north at the same time. Much of the water from the north would be caught in the canal, carried east, and disposed of without entering the congested portion of the Huai River, which could then accommodate the flood from the west with ease.

In building this canal proper regulating gates should be built wherever a natural watercourse is crossed, by which the water coming from the north may be passed down the natural watercourse or along the canal as may be thought best. In the case of heavy floods as much water as possible would be forced along the canal and reach the Hungtze Lake below the congested portion of the Huai River, thus leaving the Huai more free to carry the flood from the west. In the case of floods from the north only, the gates could be opened and each watercourse used to its safe maximum capacity, the balance passing along the flood canal.

With a suitable flood canal and regulating gates, much could be done to regulate the floods and lower their level.

The flood canal would be the last factor in the conservancy scheme. It should not be constructed until a careful study of the floods had been made for some years, and the effects of the outlets of the Hungtze Lake and the Huai River noted. There is, of course, a great probability that after reliable data has been obtained and the improvements in the Huai River and lake regions have been completed, this flood canal may not be found necessary. But only careful survey of the conditions and future results of the improvements can answer this question.

If the flood canal is constructed care should be taken that by means of proper sluices on its south side it would be possible, when necessary, to irrigate the country to the south.

THE WORKING OUT OF THE ABOVE SCHEME OF CONSERVANCY AND RECLAMATION.

The first thing is the hydrographical survey of the sea coast from the old mouth of the Yellow River to Haichow, to determine the most suitable points of discharge for the Shu River, the Yi River and the new outlet to the Hungtze Lake down the old bed of the Yellow River.

The Shu River.—With regard to the Shu River there appears to be no necessity for control or regulating works beyond small sluices controlling the entrance of the drainage canals. The main features of the conservancy of the Shu are to give it a clean, well defined channel to the sea, and to see that this channel and its mouth are not allowed to silt up. The channel should be excavated sufficiently below the land surface to drain the country and swamps through which it runs.

The Yi River.—With regard to the Yi River its natural outlet is by the Grand Canal to which it supplies water. The new flood channel should be cut through the Loma Lake, and thence by the best route to the sea, probably utilising and improving some already existing watercourse. The different

branches of the Yi River to the Grand Canal, at the points were they leave the main river, should all be supplied with regulating gates in such a manner that the amount of water passing into the Grand Canal can be under proper control. This also includes gates where the flood canal branches from the main river to the Loma Lake. By this means only the requisite amount of water will enter the Grand Canal, and in the dry season the entire discharge of the Yi River will be available, while during the rainy season all excess of water will be carried away by the flood canal.

Control Works in the Hungtze Lake and the Huai River Conservancy

In the final disposition of the flood waters of the Hungtze Lake and Huai River systems certain important questions must be considered as to the absolute control of this disposition. All of these waters are drained into the Hungtze Lake, and from this basin two outlets are provided, viz:—

The Canal via Tsiang Kia-pa to the Yangtsze west of the Grand Canal.

The Canal to the east through the old bed of the Yellow River to the sea.

These two outlets will branch from the undrained portion of the Hungtze Lake, and of the two the one to the east should have the greater capacity, as during a flood it would be by far the more important.

The Yangtsze Floods

At times heavy floods occur in the Yangtsze basin and the Huai basin simultaneously, but fortunately this is not always nor even often the case. When the Yangtsze is in great flood the utility of the Tsing Kia-pa canals as flood canals would be decreased, and the greater portion of the Hungtze Lake surplus would be run off through the canal to the east.

Regulating and Control Works

In years of low water in the Yangtsze and floods in the north, the amount discharged by the two canals should be so regulated that the Yangtsze canal would carry a safe maximum.

What remains of the Hungtze Lake after being drained to a certain level would serve, in an emergency, as a storage basin for the floods from the north and west, and from this basin lead the two outlet canals.

At the inlet to each of these two canals must be regulating sluices for the perfect control of the amount of water passing into each canal, and in connection with this regulating work there should be a suitable chamber lock for the passage of boats each way at all times.

Additional Examinations Necessary

The Ke River.—The Ke River should be examined from its mouth to its source west of Khaifeng-fu, its normal and flood discharges measured, and water gauges established at necessary points.

The Sha River and Other Tributaries of the Huai.—What has been said above applies to the Sha River and the tributaries of the Huai River to the west, and also to the Huai River itself to its source.

Swamp Lands.—The large area of swamp lands near the sources of the Ke and Sha Rivers should be examined with a view to drainage.

The Yellow River.—The most dangerous and menacing factor connected with any conservancy scheme for lowering the flood level and reclaiming the swamps and shallow lakes in North Anhui and North Kiangsu is the Yellow River on the north. If this river should break its dykes on the south and flow once more into the basin of the Huai, much of the problem of conservation would have to be re-solved. That such a break may occur is always a possibility which must be taken into account.

As soon as possible an accurate survey should be made of the Yellow River from the sea to the crossing of the Peking-Hankow Railway, and this survey should be continued up the river as rapidly as time and available money will permit, including the taking of levels, cross sections, gaugings, etc., with a view to the future regulation of this river.

The northern limit of the Huai basin is practically the southern dyke of the Yellow River, and this dyke should be most carefully examined for any leakage or seepage which may be taking place. If a break should occur in these dykes the most probable points would appear to be somewhere within the eighty mile section east and west of Khaifeng-fu, Honan, or more to the east where the Yellow River is now crossed by the Grand Canal, but of course a flagrant neglect of the dyke at any point might result in a break. The dykes should be watched with the greatest of care, and the men in charge should be held under the *strictest discipline*.

It is to be hoped that with this new era in China an exhaustive study of the Yellow River will be made, and means found to control it to a great extent, as there is no doubt that such controlling and training are possible.

With money, engineering skill and a strong permanent administration into which politics will not be allowed to enter, much could be done to eliminate the dangers due to the untamed condition of this river.

Permanent Engineering Department

The most immediate need in the Huai River and Lakes Conservancy is a well organized Engineering Department.

The surveys already made by the Chinese survey students are of some value, but the organization has no definite head, the control is very loose and haphazard, and the men in control are totally lacking in all technical knowledge of the requirements of the problem of the methods necessary in the mere matter of surveys. Much time and money has been expended on relatively unimportant work, whilst the essential and urgent work has not been done at all. The office records of work done in the field are hopelessly in confusion. All these faults may be remedied with reorganization, method and discipline, and several well organised engineering parties should be put into the field at once.

So far the work of conservation has been considered by the Chinese merely from a provincial standpoint, and in the work done so far, Anhui and Kiangsu are intensely jealous of their own provincial rights, to the great detriment of the work. This conservancy work cannot in any way be considered provincial, if it is to be attended by any success. It is and must be of a purely national character, and carried on without the slightest regard for provincial boundaries. Topography and rainfall are the ruling elements to be considered. The administration, engineering, etc., of the conservancy must deal only with the Central Government and draw its funds from the Central Government. In the question of private lands which may be needed for the work, the Conservancy Board should have the right of "Eminent Domain," the price being settled by arbitration, or if necessary the land condemned and the price settled afterwards.

In this Report it is not necessary to go into the details of the Conservancy Organization and methods of work, but a definite well disciplined organization is needed.

Weather Bureau

One of the most important departments of the Conservancy Organization, and one that should be organised and put into operation as soon as possible is a Weather Bureau, with stations established at all necessary points in the entire catchment area of the river systems under consideration.

Equipment

These stations should be supplied with the following equipment :—

Wind Gauge, giving the direction and velocity of the wind.

Rain Gauge.—To measure the actual rainfall.

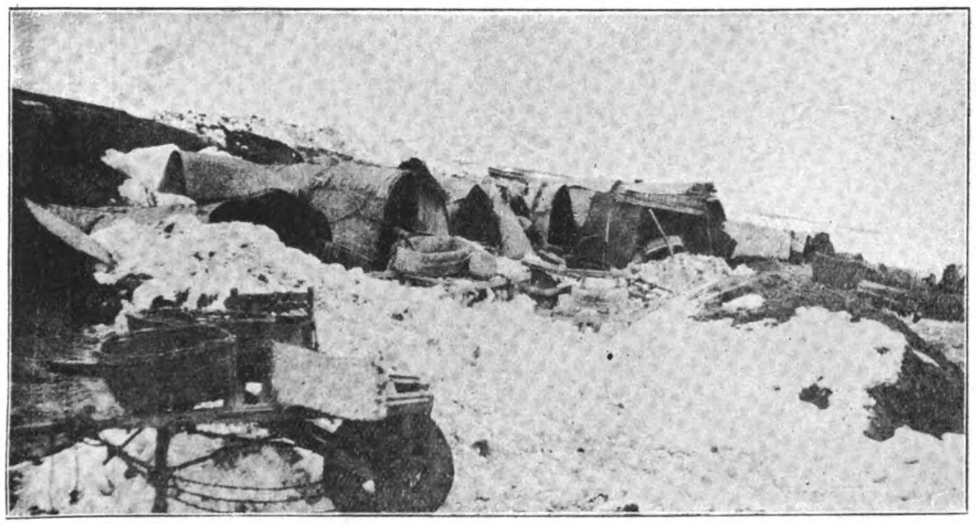
Wet and Dry Thermometers.—To give the degree of moisture.

Maximum and Minimum Thermometers.—To give the temperature.

Aneroid Barometers.—To give the atmospheric pressure.

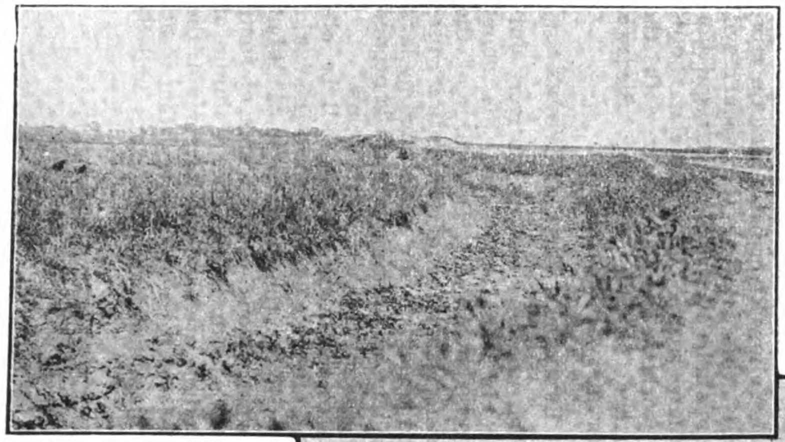
A FLOOD SCENE

A picture taken at Wuhu showing a Chinese trying to save some of his effects by putting them on the roof of his house

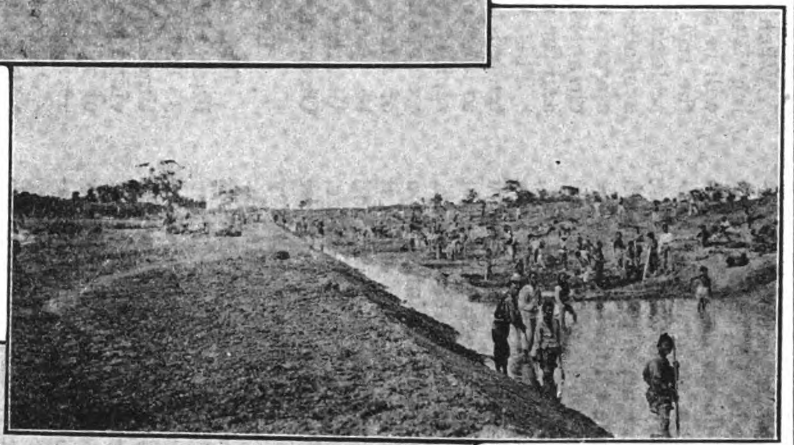


FAMINE SUFFERERS

This picture shows the conditions under which famine sufferers, whose homes had been destroyed, lived during the winter while the snow was on the ground. The past winter was a very mild one, and the snow lasted but a short time

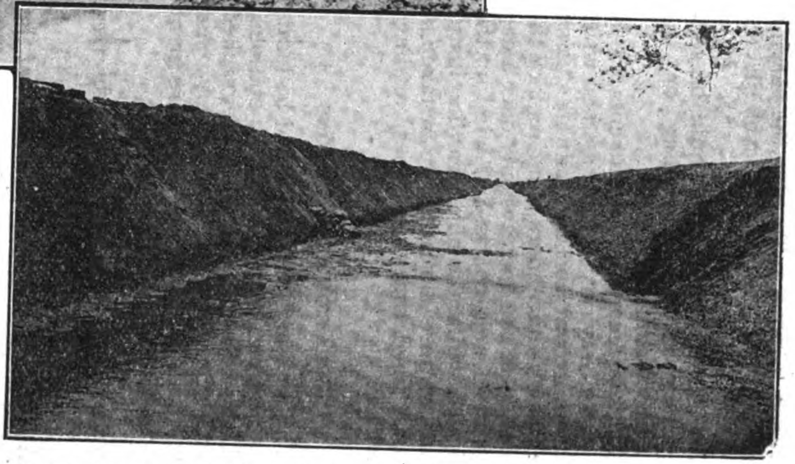


THE ORIGINAL DITCH



EXCAVATING WORK IN PROGRESS

NEARING COMPLETION



THE DITCH IN ITS FINISHED FORM

DITCH WORK DONE BY THE FAMINE RELIEF COMMITTEE

Water Gauges.—To give the varying elevations of the water level in the rivers.

All these instruments could be self-recording or not, depending on the amount of money available.

The self-recording instruments are in in every way preferable, as they write out the record for each minute during the twenty-four hours, and require the attention of the operator only once a day to put in new charts and wind up the weights, whilst the non-recording instuments require a reading to be taken at certain fixed times, and these readings recorded.

LOCATION OF STATIONS

The weather stations should be located at points having telegraph stations, and the records should be telegraphed to the Central Office each day, and many times a day when there are great atmospheric disturbances.

NECESSITY AND ADVANTAGES OF THE WEATHER BUREAU

At present there are no records of the rainfall in the entire region under consideration. No one knows how much rain falls during the year or at any one time, and no one knows the actual effect the rain in any one area has upon the rivers into which it flows. The only thing known is that an excessive rainfall results in floods, but this is not known until the floods arrive. With the Weather Bureau stations in operation a rainfall of any importance may be foretold at least twenty-four hours in advance. When the rainfall arrives the actual amount of it can be measured and the duration recorded. With this data, given a rainfall in any part of the catchment area, say the mountains of Honan, not only will the actual amount of water which has fallen be known, but also the effect of this rainfall upon the streams and rivers through which it flows away will be known hours and days before the arrival of the water, depending upon the distance from the actual rain centre. For instance, heavy rains occur in the mountains of Honan. The duration and number of inches are wired to the Central Station. From there advice is at once telegraphed to the towns, cities or control works affected, that at such an hour the river will begin to rise, and will probably reach such-and-such a maximum elevation. Thus there is ample time to take all necessary precautions, and with the regulating works handle the floods with a minimum of damage. By means of the daily Weather Reports the farming and boating people can arrange their affairs with much more certainty and profit.

When the Conservation and Regulating Works are completed, this service will be absolutely necessary in order that the full value of the work done may be realised. Advance knowledge will be available of the coming of floods, the amount of water to be taken care of, the channels through which it will come, and the moment at which it will arrive.

This Weather Service should be extended to the Yangtsze Valley and also to the Yellow River basin, and the more rapidly this is done the sooner will exact data be available for the regulation of these rivers. This Bureau should be worked in connection with the Weather Bureau of the Siccawei Observatory, Shanghai.

ESTIMATED COST OF WORKS

The estimated cost of the work outlined in this report will be about 35,000,000 Mexican Dollars, and the time necessary for its completion—provided no delays are occasioned by lack of money at the time when it is needed—will be from six to seven years.

As to the results which will be obtained after the completion of the work, they will be: the doing away of all but abnormal floods over an area of some 17,000 square miles, the draining of this whole area and the lowering of the flood level to such an extent that in all but abnormal years two crops will be

A GROUP OF REFUGEES PASSING THROUGH HWAIANFU, IN N. KIANGSU

All of the family possessions, excepting perhaps an acre or two of land, are on their backs or on the wheelbarrow

possible each year, where, under present conditions, two crops in five years is the rule.

In addition to this improvement in land which is now supposed to be under cultivation, there will also be reclaimed some 6,000,000 Chinese *mou* of land which is now absolutely valueless, being covered with shallow lakes or swamps.

There will also be a saving of the cost of the annual famine relief, which for many years has been poured by millions and millions of dollars into this section of China.

The moral results will be the elimination of the suffering, starvation and degeneration of several millions of people, who now are fast becoming beggars and robbers; the turning into producers of these millions who now are not only non-producers, but are becoming a menace to the country and cause of unrest and lawlessness.

In view of these obtainable results, the expenditure of this vast sum of money for the conservancy of this region is not only justifiable from a financial point of view, but is a moral necessity for the good name of China.

STRAITS SETTLEMENTS HARBOUR WORKS

At a recent meeting of the Straits Settlements Legislative Council His Excellency Sir Arthur Young, the Governor, referred to the harbour works of the colony, in the following terms:

The net revenue of the Tanjong Paga Dock Board for the half-year ending December 31, 1911, was $909,416 and that for the half-year ending June 30, 1912, $904,264 or in the aggregate for the period under review $1,813,680, showing an increase of $383,194 over that for the year ending June 30, 1911.

The number of vessels using the wharves during the year ending 30 June, 1912, was 2,634 with a net registered tonnage of 5,156,066 tons as compared with 2,404 vessels of a tonnage of 4,698,160 for the previous year ending June 30, 1911.

The quantity of coal and cargo handled in the corresponding periods above named was 2,467,785 tons and 2,333,832 tons, respectively, showing an increase of 133,953 tons for the current year.

The above figures may, I suggest, be considered satisfactory, especially having regard to the inevitable dislocation of facilities on the premises and curtailment of accommodation at the wharves during the works of reconstruction and extension now in progress at Tanjong Pagar.

The construction, departmentally, of a further section of the West Wharf, referred to in my address of last year, would appear to have fully justified its execution and has provided some considerable measure of relief to the congestion engendered by the suspension of the works by Messrs. John Aird & Co., in the early part of last year.

I informed you last year that the differences between this firm and the Board formed the subject of proceedings in the Courts in England. The proceedings still continue but the case is expected to come on for hearing during the present month.

With regard to the progress of the Lagoon Dock and Main Wharf Reconstruction Works at Tanjong Pagar, it is satisfactory to be able to state that in the hands of Messrs. Topham, Jones and Railton, who took over their completion, under contract, on July 18, 1911, the works have been vigorously prosecuted and show marked evidence of their occupation.

The value of work executed by Messrs. Topham, Jones and Railton as certified for payment under the Supplemental Contract up to June 30, 1912, is £138,400 and the average number of men employed on the works is two thousand.

The construction of the New Graving Dock at Kepple Harbour has progressed most satisfactorily and is now rapidly approaching completion. The construction work of the Dock itself is finished and the entrance walls and dredged approaches, together with the general formation of the quays, etc., are being pushed on vigorously by the Contractors, Messrs. Topham, Jones and Railton, while the Caissons, Pumping Machinery, Cranes, and general equipment of the Dock are all well in hand.

The total value of the work executed up to June 30, 1912, on the Graving Dock Contract is £296,600 and the average number of men employed is between eight and nine hundred.

SINGAPORE HARBOUR WORKS

Good process has been made during the past year with the works to be carried out under

HAICHOW CITY

stree in the centre of Haichow city, the propose new port

the Supplemental Contract dated August, 1911, for the completion of the Harbour Scheme.

The two portions of the Telok Ayer Quay Wall have been completed to a total length of 4,140 ft., and the returns forming the ends of the two piers, pounding the tidal basin are almost complete. The sinking of cylinders for the two piers and the preparation of ferro-concrete superstructure of the same are well forward.

The reclamation of the site surrounding the tidal basin has continued satisfactorily, the material for the purpose having been derived from Mount Palmer since the completion of the excavation of the Government property at Mount Wallich,

Good progress has been made with the Mole, a total of 291,000 tons of granite having been deposited during the period under review.

The number of men employed is at present about 2,050 of whom 100 are Europeans and the total sum paid to the Contractors for work done during the past twelve months was £246,500.

GOVERNMENT WHARVES, PENANG

The net revenue from the Government Wharves, Penang, for the year ending June 30, 1912, is $92,382 as compared with that of the previous year to June 30, 1911, $97,754.

The tonnage handled in Coal and Cargo for these periods is, respectively, 615,686 tons and 501,032 tons.

NEW COMPANIES

Manila Motofoto Company.—The Motofoto Company incorporated with a capital of P.8,000 has been organized and application for registration filed with the Bureau of Archives. This company proposes undertaking general photographic work, moving picture films, operate theaters, movies, etc., in the islands. The incorporators are: Frank H. Goulette, E. A. Cuddy, O. S. Cole, E. I. Standish, Frederick Hollins, W. K. Bachelder and E. I. Young. E. I. Young, has been nominated treasurer and a large portion of the stock is subscribed.

San Miguel Brewery. — Seven million pesos is the amount for which the new Roxas-San Miguel brewing company is capitalized, and the application for the issue of papers of incorporation will be made as soon as certain minor details have been attended to. The new company is an accomplished fact, however, save for the formal matter of the application for papers, and already P. 6,500,000 of the total capital has been subscribed and fully paid up.

The company takes over the business of the San Miguel brewery, and the incorporators of the new enterprise are Antonio R. Roxas, Enrique P. Brias, Enrique Zobel, Ramon J. Fernandez, Francisco Ortigas, Jose M. Tuason, and Antonio Brias.

All but half a million pesos worth of the capital is already subscribed, but that balance will be offered to the public in 5,000 shares of P.100 each.

Manila Brewing and Malting Co.—Incorporation papers of the Manila Brewing and Malting Company were to be filed on Oct. 1, Work is to be started on the buildings by the first of the year.

Stockholders have already subscribed P.80,000 of the P.250,000 worth of stock to be issued. Max Druseidt, one of the heavy stockholders, subscribed P.48,000, and will be president and treasurer. Harry L. Kreidt, manager of the printing and engraving department of E. C. McCullough Company is to be secretary and general manager and a brewmaster is to be imported from Germany.

All machinery is to be secured in the United States and the most modern equipment is to be imported. Plans are now being drawn and there is every reason to believe that work will be started by January 1.

There are 10,000 shares at P.10 a share and stock is to be issued as soon as the concern begins to brew.

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FAMINE PREVENTION IN CHINA

In this issue we are able to publish the exhaustive report prepared by Mr. Charles Davis Jameson, Mem.-Am. Soc.C.E., on "River, Lake, and Land Conservancy in Portions of the Provinces of Anhui and Kiangsu, north of the Yangtsze River." Mr. Jameson was despatched to China by the American Red Cross Society to accomplish this work, the object being to present to China a practical scheme whereby something tangible might be effected to prevent the continual recurrence of famine and the contingent periodical toll of human life and human degradation, as well as to render immune from ordinary floods huge tracts of cultivable land which have been converted by natural deficiencies and culpable human negligence into unproductive wastes. Mr. Jameson has done his work well. Perusal of his informative findings will repay all who take an intelligent interest in the up-building of China, and all who have in the past so generously contributed towards the relief of the millions of sufferers upon whose behalf appeals are constantly being made to the world.

Mr. Jameson commenced his investigations on April 18, 1911, and concluded them on June 14, 1912, during which time he travelled some 20,406 li, or roughly, 6,802 miles. He brought to bear upon his work not only an intimate knowledge of China, but also previous experience in the problems of his profession peculiar to the task in front of him, and the result has been the preparation of the only practical programme of conservancy work yet presented in China for famine prevention. The Chinese people and the Chinese Government have for so long been beholden to foreign charity for aid to save their suffering fellow nationals that it is now distinctly incumbent upon them promptly to take advantage of Mr. Jameson's efforts and concrete suggestions if they wish to escape a charge of callous indifference to the trials of the unfortunate inhabitants of the famine areas or a woeful disregard of national duties. China cannot decently depend much longer upon foreign initiative in famine relief and prevention, and if there is pride in this new Republic surely it can be mustered to spur the provinces on to a common effort to make the reclamation of Anhui and Kiangsu a national enterprise!

The Central China Famine Relief Committee, in the report of their work just issued, make a strong appeal to this end, and draw special attention to the fact that, although many lives were saved, and much useful work was done, they considered the present methods of famine relief utterly inadequate. They appeal to the Republican Government and the people of China generally to realise that another famine is almost certain to occur in the near future, unless immediate steps are taken to begin river conservancy works. By this alone can famines be averted, and by this alone can the economic, intellectual, and moral condition of probably not less than five million people be salved and safeguarded. While recognising that the Central Government finds itself in urgent need of money for many different purposes the Committee nevertheless feel that from the earliest loans that may be made a sufficient sum should be set aside for the beginning of conservancy work. This is an appeal which should be earnestly listened to by the Government as a duty to the people and the country, and steps should be taken immediately to have an intelligent practical interpretation made of Mr. Jameson's suggestions.

The cost of a thorough scheme of conservancy would be enormous. Mr. Jameson estimates an expenditure of thirty-five millions ($35,000,000) Mexican dollars, and some six or seven years of time to carry out his proposal. But the results will justify that expenditure. He foresees the prevention of damage by all but abnormal floods over an area of some 17,000 square miles, and the amelioration of conditions to such an extent that two crops will be possible each year, where, under present conditions, two crops in five years is the rule. There will be reclamations of some six millions Chinese mow of land now valueless; the obviation of a flow of millions upon millions of dollars into the affected territory in the shape of famine relief from foreign sources; the elimination of the sufferings, starvation, and degeneration of millions of people, fast becoming beggars and robbers, and their conversion into producers and useful citizens.

China now has before her the report of Mr. Jameson, and the report of the Central China Famine Relief Committee. Are there not some Chinese patriots who have the courage and the influence to arise before the seats of the mighty and compel serious consideration of the suggestions contained in these reports with the object of once and for all removing the disgrace that besmirches the escutcheon of the nation?

MONEY IN CHINA

To the average layman words and phrases such as "Bi-metallism" and "The Currency Problem" when seen at the top of a column, act as an irresistible inducement to "skip." The intricacies of the subject are certainly awe inspiring, and, for the greater part, writers on these subjects utilize such highly technical phraseology that the reader who ventures upon the search for financial light, retires with his brain reeling and a more settled ignorance of the subject than before. It is therefore with real pleasure that we publish in

this number a precis of the lucid and illuminating contribution to the study of the currency problem in China prepared by Dr. Vissering, who combines the most profound expert knowledge with a tender regard for the non-technical reader. The average layman, we confidently assert, will gain more real knowledge of currency matters in general, and of China's money problems in particular, from the perusal of this precis than could be obtained from any other exposition of the questions involved that has recently seen the light.

It is not our purpose to traverse the ground covered by Dr. Vissering at this juncture. Our immediate object is to direct the attention of non-technical readers to the fact that Dr. Vissering's report is expressed so clearly that the assimilation of the really valuable information incorporated is a pleasure instead of a task.

China, unfortunately for herself, does not make the best use of the work of the experts she pays to advise her. The practice has been adopted of paying advisers handsomely and keeping their reports as pleasant records of their activity, too precious to be removed from departmental pigeonholes. Even now, when a new spirit is supposed to be inspiring China, we find her proposing to take steps likely to defeat the objects sought to be attained by Dr. Vissering. The following telegram, dated Peking, November 11, shows that the Government is unwisely attempting to take short cuts, when, as Dr Vissering proves conclusively, short cuts would almost certainly lead to disaster:—

"The Cabinet held a special meeting on the 10th inst., at which it was decided (1) that a special treaty be entered into with the Mexican Government to limit the importation of Mexican dollars, (2) further manufacturing of copper coins should be prohibited throughout the country and (3) the paper notes issued by the former military authorities should be withdrawn and only the Government will have the power to issue notes thereafter. The various foreign banks will be requested to withdraw the banknotes issued by them to a certain extent, as the bank authorities consider convenient."

A much wiser step has been taken in calling upon the provincial authorities for full reports in regard to the coins and tokens in circulation, and for information relative to banknotes. The information sought will be invaluable when currency reform is seriously entered upon. The questions asked, according to the *Peking Daily News*, are as follow:—

1.—What are the kinds of dollars that are in current use in your locality?

2.—The dollars of which provinces are accepted most readily on the market?

3.—Are the dollars of other provinces subject to discount on the market? If, so, how much upon each dollar?

4.—What is the weight of the dollar coined in your province? Its percentage of silver, of lead or copper?

5.—Since the establishment of the Central Mint in Tientsin, how many copper cents has your province coined? How is their circulation on the market?

6.—What is the exchange value of the copper cents for the silver dollar in your locality?

7.—Is there any discount on the copper cent in the market?

8.—Are the small silver pieces readily accepted on the market? What are their relative values?

9.—What are the kinds of the bank notes used in your locality? Which are the most popular? What are their face values?

10.—What is the amount of the bank notes that have been issued thus far? Are there reserves in the banks for the issue of these bank notes? If so, how much?

11.—Are the bank notes readily accepted on the market? Are they driving the silver and copper out of the market?

12.—Besides the bank notes, are there other kinds of notes, such as cheques and promissory notes, used on the market? If so, what are their systems of management?

Dr. SUN YAT SEN'S RAILWAY SCHEME

Fourteen years ago when spheres of influence were accepted as the expression of foreign policy towards China, and the world freely discussed the partition of the Empire amongst European Powers, and at a time when the mailed fist was banged on the table at Peking to secure leases, concessions, and loans, a railway scheme for the country was evolved. The needs of China were not consulted except inasmuch as the country would benefit by the construction of any line between two cities. All Powers laid down certain projects within the confines of their respective spheres of influence, having for their main objective the development and aggrandizement of the leased or ceded ports on the coast of China, or the enrichment of special foreign interests. And the lines then projected still stand as the only scheme for the construction of railways to develop the country. Foreign maps of the country published ten and twelve years ago, strikingly illustrate the set foreign policies behind most of the schemes.

It is interesting to know that twelve years ago, when foreign railway projectors had linked up the principal centers of China, with lines serving particular political ends, there was one man in China devoting his time to dreams of a purely national system which would counteract the other schemes and serve to advance the special interests of China. This Chinese patriot had other visions: he saw in his dreams the overthrow of the dreaded and tyrannical Manchu dynasty, and the creation, in the ruins of the oldest empire in the world, of a new Republic. Surely he was a visionary, a dreamer of dreams, and one to be shunned by practical men! But the dreamer walked in his sleep. He kept moving onwards. His path led him around the world, where he told his fellow countrymen of his visions. The Manchu Government laid a price upon his head, and emissaries were despatched to follow and awaken the sleep walker, or lead him to an eternal slumber. He passed his years in exile, and labored to make his dreams come true. A year ago the miracle of miracles occurred, and the hoary old Empire tottered to its fall, before the wave of republicanism which swept over the land. The dreamer awoke to find himself famous—the chosen President of this great Republic. Rather a practical ending to such an impossible and impracticable vision! The world has need of dreamers like Dr. Sun Yat Sen. And yet, despite the great object lesson of this crusade and its grand culmination, there are those who still refuse to recognize in Dr. Sun's schemes anything else but visions.

When on the realization of his dreams to secure peace for his country, the patriot stepped aside, and unselfishly gave way to Yuan Shih Kai, the practical world again jeered and refused to understand an action too lofty for selfish and mercenary minds to grasp. It is also interesting to know that as soon as the dreamer awoke to find his one great vision realized, he slid back again into the land of nod, and his mind centered on the old wall map on which he had, ten years before, traced out a system of railways for his country. Knowing that the consolidation of China, the development of her industries, the growth of her agriculture, the exploitation of her mineral wealth and her political future, could only be secured by the civilizing factor of a great network of railways, the dreamer again started to walk and travel throughout the land to educate the people to his view point.

He knew that foreign Powers and syndicates had cast covetous eyes on certain sections of his mother land, and that their policy towards his country found expression in their railway projects. He knew also that there were many treaties, conventions, understandings, protocols, leases, concessions, loan agreements, and other documents, some secret, some public, that had been drawn up and signed in the past restricting his country in the free development of its resources and construction of railways. He knew that certain nations had arrogated to themselves, by Right of Might, certain powers which infringed the sovereign rights of China, and prohibited the free construction of certain railways without their consent. He knew that many financial, and engineering problems and obstacles had to be solved and overcome, before his dream would come true. He also realized that the provincial rights had to be given careful and equitable consideration, and that the relation of the provinces to the Central Government must be clearly defined before a national system of railways could hope for success.

He knew that railway control was one of the most vital questions of Chinese domestic politics and that several Presidents of previous Railway Boards under the old regime had resigned rather than face the temper of the people. He knew that to the outside world, the question of provincial railway rights was the one which had been employed to arouse certain sections of the country against the greed of the Manchu authorities. He knew all this, but he also knew what the outside world did not know or understand: that all this hostility of the provinces against the interference of Peking in the control of railways was only one of the many outward manifestations of the revolutionary movement that he himself was responsible for. And he felt that now the Republic was established, this phase of the situation, so troublesome and dangerous to the Manchus, would disappear in time, before a campaign of education. In fact, Dr. Sun Yat Sen was fully cognizant of all the political and other obstacles in the path of railway construction, yet firm in his conviction that communications were the key to the future position of his country, he set to work to devise a preliminary scheme which would serve to arouse enthusiasm throughout the country, and provoke a healthy discussion of the whole subject. Had Dr. Sun been actuated by a desire to secure personal honour or temporary profit, he would have confined himself to projecting some little five hundred mile line, threading its way carefully through districts or between cities not covered by existing agreements. And the little circle of foreigners at Peking, would have clapped their hands with delight and applauded such an exhibition of statesmanship and practical politics.

But the dreamer dreamed, and he saw in his prophetic mind, the vast surface of his country, gridironed by railroads, with all the leading cities connected together, and the whole forming a system, such as those of which America or European countries could boast. The petty squabbles of foreign syndicates over rights to construct this or that section, or the claims of others to concessions forced from the country when the rulers were ignorant of their commercial or political value, did not enter the mind of Dr. Sun when he drew the lines of his system on his map. What are the rights of a few foreign syndicates as compared with the welfare of a great nation? All the rights already ceded away do not embrace more than 1,000 miles, and what are 1,000 miles of railways in a country so vast as China? And Dr. Sun while he recognized existing rights, limited to certain small sections of lines, embraced them all in one big scheme. He saw in his mind's eye that some day in the future, the country could easily find room for 60,000 miles of railways, so he drew them all in his map. And he tucked the map under his arm and carried it to Peking, and there in the presence of the President and his Cabinet, the Ex-President laid before them his ideas of what a railway system for China really ought to be. To those of the old regime, whose horizon had been limited to the construction of this or that line for the sake of the official profits connected with the enterprise, such a comprehensive scheme was naturally too big for them to grasp. But President Yuan gave way before the earnest arguments of the Ex-President and then and there gave his assent to the scheme, and issued a Mandate empowering Dr. Sun Yat Sen to enter into negotiations for the financing and construction of the lines. In many speeches at Peking and elsewhere Dr. Sun emphasized the necessity of an adequate system of railways, and to arouse the interest and enthusiasm of his audience, dwelt on the great extent of mileage needed to develop the country. He accomplished his object. He left Peking for the South, to take up his great work.

With a thorough understanding and mutual confidence between the President and Ex-President, the political peace of the republic is assured. Had Dr. Sun Yat Sen held out firmly at Nanking he might now be the President, but he willingly sacrificed his personal ambitions for what he considered the best interests of his country, and to hasten the return of peace. President Yuan can only have one feeling for Ex-President Sun, and every instinct of honor must bind him with the closest ties of friendship for the man who made possible his ascension to his present high position. And despite the many rumors finding credence in Shanghai and elsewhere, it may be affirmed that the most cordial and friendly relations exist between the two leaders of the nation. If President Yuan is strong in the North, Dr. Sun Yat Sen still controls the South, and practical politics, apart from friendly motives, must influence the President in retaining the support of Dr. Sun, and practical politics in addition to strong ties of friendship will guide the President in his future attitude towards the man to whom he has entrusted the construction of railways. It has been urged in some quarters that President Yuan and his adherents in Peking, animated by petty and unworthy political motives, only sanctioned Dr. Sun's plans in the hope that by so doing, he would hasten his political downfall, and by a premature exposition of his schemes the people of the country would turn against him. It has also been urged that the sum appropriated to defray the expenses of Dr. Sun's railway office, was only the price to purchase his political support in the future, and that the Peking authorities did not intend that Dr. Sun should ever seriously undertake negotiations for the financing or construction of railways. In other words, that the Peking authorities did not take Dr. Sun's appointment seriously and that as soon as he attempted to put his ideas in operation, obstacles would be placed in his way to frustrate their practical application.

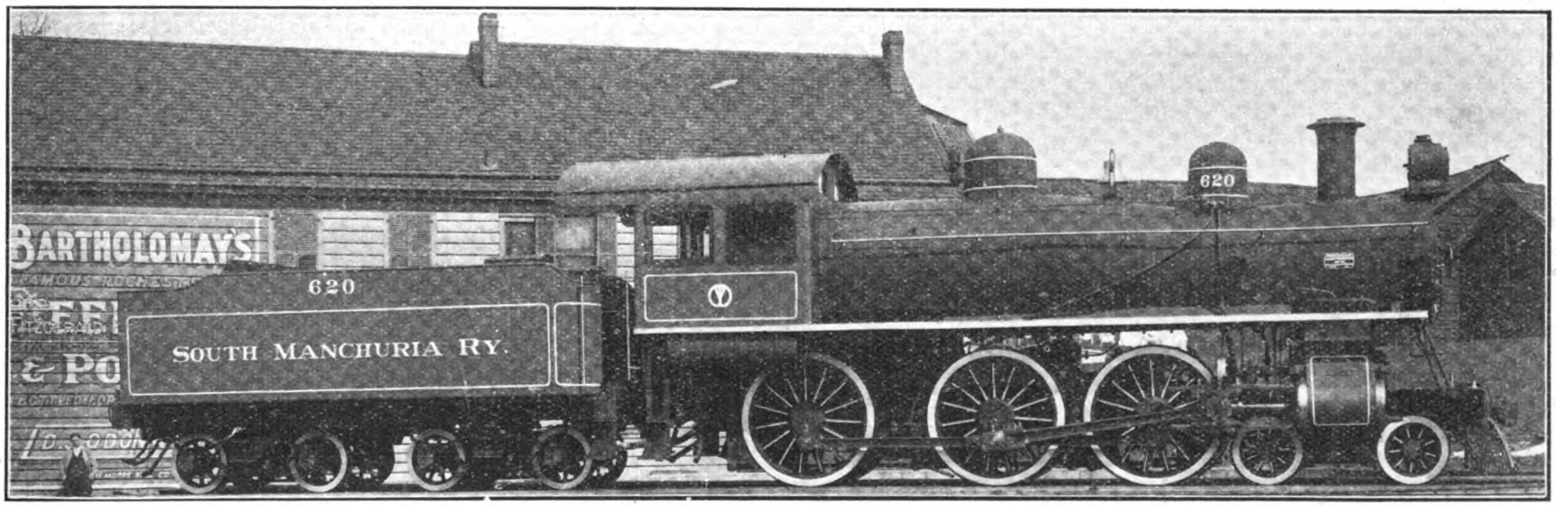
It is obvious that such stories can have little foundation, for reasons already stated, for President Yuan would not deliberately wound the feelings of Dr. Sun, or forfeit the support of the South, by any international slight to its acknowledged leader.

There may be many of the old regime, some of whom are still in power, who look backward to the old order of things and resent the President's appointment of Dr. Sun Yat Sen to a position superior to that of the Minister of Railways, in regard to the construction of new lines. In fact considerable criticism has already been aroused, some characterizing the appointment as superfluous, and conflicting with the duties of the Ministry. There are, however, good precedents for the creation of a special Commission to study national railway conditions and necessities; devise a general scheme; originate a railway policy and enter into necessary financial arrangements to make it a success. The powers of such a Commission, or independent national railway organization, need not conflict with the control over existing lines. The Ministry of Communications may still exercise full authority over all lines in operation; those under construction and those already provided for. Other countries have found it profitable to entrust the work of projecting new lines to a special permanent commission working independently of, but in harmony with, the Central Railway Board. In any country operating a national system of railways, where the supreme control is affected by politics, and where the responsible authority holds his position by virtue of political influence, the existence of a permanent Central Railway Commission insures the constant evolution of a national railway policy, unaffected by the changes in the Central Board. It has already been pointed out that China has no definite national railway scheme for the development of her territory, apart from the many semi-political lines and extensions advanced by foreign Powers for the furtherance of their own interests. And during the last fourteen years, and especially in the last four years, there has been such a procession of Presidents or Ministers, in temporary control of the Railway Board, that it has been impossible for any one of them to concentrate his thoughts or time upon any general scheme for the welfare of the nation. Under the old regime, the Presidents of the Railway Boards were fully occupied in dealing with the schemes advanced by foreign interests. Conditions have changed. No longer can China wait upon the whims of any high official temporarily filling the post of Railway Minister. Ministers come and Ministers go, and each one has his own ideas of railway construction. In the one year since the establishment of the Republic, three excellent officials have presided over the Ministry of

Communications. Although it is to be hoped that the present incumbent may retain the portfolio for a few years, there is already talk of shifting him to another Cabinet position, and appointing a new man to fill the vacancy. While such conditions exist at Peking, the best interests of the country demand the existence of a purely non-political permanent Central Railway organization, that will draw up a national scheme, originate a policy, and devise a way to finance it along the most equitable and just lines for the nation and the investor. With such a Board exercising its functions safe from political attacks, the Ministry of Communications may remain in the arena of practical politics, and its head may be shifted at the will of the President, without in the least retarding the all important work of developing the country.

So, aside from the strongest ties of gratitude and friendship, and the promptings of practical politics, President Yuan must be influenced by the pressing economic demands of the country, to stand by and support Ex-President Sun in making his work a success. Dr. Sun's plans may appear to some in Peking, as mere dreams, and they may attach little importance to his scheme, but they will have to admit that Dr. Sun is a very wide awake dreamer, and has a habit of doing things while others talk about them. Dr. Sun has taken on his shoulders the most important task of the Government. Nearly all of China's foreign troubles are bound up in railway concessions, and her greatest domestic political differences have arisen from the same cause. How many men under the old regime shirked the responsibility of their position, rather than face the determined attitude of the provinces on the railway question? And yet, with a full knowledge of the gravity of the situation, with powerful foreign and domestic influences to contend against, Dr. Sun Yat Sen accepts a duty and enters into a work, in which no other single official in China could hope to succeed. The Ex-President is the only man in China, apart from President Yuan, who commands sufficient influence at home and abroad to insure the sympathy of his fellow countrymen and the respect of foreign financiers. He has willingly sacrificed his personal ambitions, retired from active politics, leaving the field clear for President Yuan, and taken on his shoulders the one great task which others have evaded. There are those who profess to believe that Dr. Sun Yat Sen having received the sum of Tls. 30,000 per month from the President, to defray the expenses of his Central Railway Office, will be prepared to accept this sum as a personal pension. Let us see how far his actions justify this unworthy belief. Dr. Sun, since his appointment to organize a Central National Railway Company, has accepted the task in the same spirit as he did the work of organizing a revolution. He travelled through the northern provinces, and at every stopping place preached the gospel of the iron rail and its advantages to enthusiastic audiences. He wended his way up the Yangtsze, and again in three provinces he expounded to the people his ideas. His personality and directness of speech won sympathetic adherents at each place, and where a year ago the provincial gentry were hidebound in their opposition to the Central Government, and the introduction of foreign capital, they are now clamoring for foreign financial help. If the Ex-President did nothing more than travel around the provinces educating the people to the necessity of foreign capital for the construction of their railways, he will have fully earned the Tls. 30,000 per month appropriated, by the Government. But does Dr. Sun accept that sum as a personal income? We are able to say that he does not, and that it is merely advanced to him by the Government as a loan—eventually to be repaid. That is the understanding between Dr. Sun and the Government. Only a man of Dr. Sun's stamp and standing could expound such a delicate and vital issue before an audience of his own countrymen, with hope of respectful attention. Dr. Sun, after preparing the way and interesting the people, settled down to equally real work. He surrounded himself with a competent staff, and opened offices in Shanghai. Everything has been conducted as economically as possible, consistent with the importance of the work. Dr. Sun himself has only accepted a modest salary from the Government appropriation for the maintenance of the office. His staff have entered into their duties with a full realization of the hard and arduous work ahead, content with the hope that they may be instrumental in bringing about some solution of the weighty problems confronting the country.

There are many important matters to be settled before Dr. Sun can take the public into his confidence concerning his plans, and invite the co-operation of foreign capitalists. There are so many divergent interests to be considered and so many difficulties surrounding the construction of certain railways in China, that the most careful preliminary studies must be made to avoid the possibility of defeat. Dr. Sun's success will hinge largely on the outcome of the first proposition. If the terms of the first agreement are equitable and just to China, and free from any taint or suspicion of graft or corruption, such as have characterized other similar deals in the past, his success is assured. And those who know Dr. Sun Yat Sen as he really is feel confident that, with frank and unreserved assistance from the quarters from which he has every right to expect support, he will succeed in transforming what the unthinking term a "dream" into a tangible reality that will work for the enduring weal of the people of China.



TEN-WHEEL PASSENGER LOCOMOTIVE

Built for the South Manchuria Railway by the American Locomotive Company. Several locomotives of the same type were delivered in 1907, the results in the operation of which were so satisfactory that six duplicate engines were ordered from the builders last fall, and delivered during the month of July, this year.

CURRENCY REFORM IN CHINA

Dr. G. Vissering's Remarkable and Valuable Report

With characteristic modesty Dr. G. Vissering, President of the Java Bank, and Monetary Adviser to the Chinese Government in 1911, describes his valuable treatise "On Chinese Currency" as "preliminary remarks about the monetary reform in China." This work has been issued for private circulation only; a restriction that we hope will be removed as the report embodies the results of careful and exhaustive investigations, presented in a lucid and illuminating manner by a writer who shows in every sentence that his high reputation as a financial expert is thoroughly deserved. In a short dedication Dr. Vissering recalls the interesting fact that his elder brother, Dr. W. Vissering, published in 1877 an essay with the title "On Chinese Currency," which was an account of the ancient currency in China. Looking upon his own labours as, to a certain degree, a continuation of the work of his brother, he has given the present volume the same title.

So comprehensive is the manner in which Dr. Vissering has treated his subject that it is extremely difficult to compress even the main features of his report within the space limitations of this article. However, the following is an extremely inadequate *precis* of his exhaustive treatise. In his introduction he gives the key-note to the following pages, *i.e.*, that in the immediate future it is likely that the monetary reform needed by China will not produce the best currency system that could be invented. It would probably be best to begin with such modifications of the currency as would offer for the time being the best chances of success, and the best security for the Government and for general business.

China has never had any real standard. Dollars of various kinds have a limited circulation, but sycee is still the principal medium of exchange. Calculations are, however, complicated in practice by the employment of a fictitous unit, the tael, of which there are more than a hundred different kinds in the country. The only real currency in the whole of China is copper. The differences in value of these copper coins renders the small dealings of the population appallingly uncertain. Any reform scheme would have to take into account the foreign dollars now in circulation which would not be accepted in the country of origin, such as the Mexican dollars—the various kinds of Chinese dollars and the sycee of different fineness. All these kinds of money should be regarded simply as bullion which could be used for the new silver coins to be issued. It would be necessary to establish a new unit and by law to fix the conversion value of the different taels expressed in proportion to this new unit. Account would also have to be taken of the immense circulation of copper coins and the wide spread employment of bank notes and other similar kinds of fiduciary money.

The Gold Exchange Standard

The gold standard is inapplicable to China at the present moment because a gold coin will be far too big a unit for ordinary transactions in the interior. The Gold Exchange Standard has the advantage of ensuring stability of prices and of international exchanges in nearly the same degree as a gold standard, provided steps be taken to guarantee the nominal value of token coins and to maintain the parity of foreign exchanges. The Gold Exchange Standard consists of a circulation, within a country of silver token currency, government currency paper or bank notes, viz., such means of payment as have not in themselves a sufficient intrinsic, or no value at all, and which are being maintained at a parity with gold, not by an extensive circulation of gold coins nor by a large stock of gold *within* the country, but by an explicit gold reserve *abroad*. This system is employed by Netherlands, India, the Straits Settlements, the Philippines, Argentina, Siam, Japan and to a certain extent by Russia.

The great difficulty would be in the circulation of token money in silver and copper. The intrinsic value of this token money must necessarily be considerably lower than the nominal value in view of the fluctuations in prices of silver and copper, as, if during a rise in prices the market value of the metal contained in these coins was to become slightly higher than the face value, they would at once be melted down and sold as bullion. It will therefore be an absolute necessity to establish a rather broad margin between the real and the nominal value of such token coins, which margin, however, will of course mean a large profit on counterfeiting, even if the counterfeiters should use the same full weight of fine metal as is contained in the legal money. Of course this counterfeiting must be prevented with all the energy which the government has at its command, and heavy punishments should be inflicted on the forgers, as they are a great danger to the credit of the state and would cause widespread disturbance of economical conditions.

It follows that a token money can only be issued by a government which is powerful enough to prevent a serious degree of counterfeiting even in the interior parts of the country and at the same time to defend all its frontiers against imports of counterfeit money from abroad. If the government were to fail in either of these respects the introduction of a gold standard or of a gold exchange standard would be an absolute failure and would entail the most disastrous consequences.

In many parts of China the standard of life is so low that even silver is too valuable to be used for any but the largest transactions, and copper is found more convenient. Barter is still carried on in many localities. One of the principal difficulties is to find a monetary system that will be acceptable throughout the immense area of China. A gold standard or any system approaching it might therefore easily be found to suit certain regions, while people in other districts would temporarily be better off, if they were allowed to keep a silver standard, or even a copper circulation, as long as this could be made to rest upon sound foundations. As long as these differences remain so pronounced, the carrying out of one single standard for the whole country at once would therefore, no doubt, cause many troubles in those parts which are not yet fit for such a system, and it is to be feared that a failure of the system, at least in some parts, would be an inevitable consequence and would entail disturbances of various kinds.

Many of the difficulties could be avoided by starting on a real silver basis, but there would then be the disadvantages attaching to the absence of a standard of value of sufficient fixity, as at present. Considering all these facts it is very questionable, not only if it is advisable, but even if it is possible to introduce at once one single system for the whole of such a country as China. European countries and the United States of America have taken time to complete their evolution and things had ample opportunity for setting. Would it thus not be a mistake to expect that China, which extends over an area many times larger than that of European countries and even that of the United States, could assimilate herself as a whole to these new conditions in a period of only a few years.

It is suggested that from the present standpoint of financial science the best monetary system for China in the first twenty or thirty years will be the gold exchange system. If carried out in a skilful manner it will procure stability of the money in circulation, and thereby insure stability of title in the interior of the country as well as in the financial relations with foreign countries; at the same time it will supply an adequate

circulation of small silver, nickel and copper coins, which will always continue to be wanted especially by an Asiatic country with a large population of rather small means. Consequently the opinion is held that the ultimate object which a present monetary reform ought to have in view is a gold exchange system for the whole of China with a circulation of token coins of silver, nickel and copper. This choice will not exclude the possibility of adopting in later years a real gold standard, if this should prove in the long run to be desirable. It will be absolutely necessary to guarantee the nominal value of these token coins by the institution of a gold reserve fund. Whether this be held in the country itself in the shape of a stock of gold or whether it be held abroad to ensure the payment of gold drafts, it is evident that satisfactory measures should be taken to protect this gold reserve from being exhausted to such an extent that the exchangeability of token coins would be in danger.

The existing silver and copper coins could be left in circulation as long as they were of any real use to the community, and new silver coins of the same size could be minted as absolutely necessary, whilst combining as far as possible right from the beginning, this silver circulation with the principles and advantages of a gold exchange standard system. A connection but *not* a fixed relation would be maintained between silver currency and gold currency; no bi-metallic system with a fixed relation between the values of two freely circulating metals, both acting as standards, should be aimed at. Bi-metallism in the old scientific sense is out of the question for China. But, with this reservation, it would be advisable during the introductory period to have two standards together: a gold exchange standard as far as possible, and also at the same time a silver standard. This is what was done in Netherlands India after the official adoption of the gold exchange standard in 1877, by legally introducing the ten guilder piece of the Netherlands as a gold standard coin, and by fixing the silver and copper coin then already in circulation as token coins in a fixed relation to the gold standard coin. These remained in circulation in certain localities and were accepted by the population at their weight of real silver. Private bank notes based on silver were also allowed unrestricted circulation for a considerable time. Simultaneously the Government maintained in circulation its own official currency, the silver and copper token coins, and eventually the gold standard coin; moreover the bank notes of the central bank of issue, the Java Bank, which are issued in guilders, were also in circulation.

The Government fixed and paid its salaries in its own official currency and made it compulsory for taxes and other payments to the Government to be settled in Dutch guilders on the gold basis. For a long time, however, the Government was quite willing to receive payments and even to pay out in silver dollars, only with this restriction that the rates were calculated a little lower than the market rate of the day in order to induce debtors to pay by preference in Dutch currency; railway and shipping companies, shops and other private institutions did the same, with the result that everyone could pay everything with his silver dollars, be it with a small loss on the rate of exchange. For larger payments it was usual, in order to save this loss, to exchange dollars for Dutch currency with some native banker or at one of the exchange banks, and to effect the payment of taxes, etc., in Dutch money or Java Bank notes. The result was, for instance, that it was profitable for the Chinese lessees of the opium and salt monopoly to ship their dollars to bankers in Singapore and to buy Java Bank notes from these bankers at a better rate than that at which the Government would have accepted their dollars. Smaller payments, however, as for tickets on railway stations and for commodities in shops were usually effected in dollars, after a calculation from guilders, in which currency most of the companies' accounts were kept. Very few Dutch silver token coins were seen in circulation, but Java Bank notes were rather more common. Therefore, though prices were often quoted in Dutch guilders, actual payments were, as a rule, made in silver dollars, dollar bank notes, or dollar paper currency from the Straits. Every inhabitant had become familiar with this situation and with the calculation of dollars into guilders and of guilders into dollars.

When the Straits dollar, in which wages for coolie labour had as a rule been contracted and paid, was fixed at 2s. 4d. in January, 1906, the plantation companies and Chinese traders in Netherlands India, who did a large importing business with gold standard countries, urged the Government to expel all the foreign dollars as speedily as possible and to enact that the official Dutch money, which is fixed on a gold standard, should alone be tolerated. The monetary situation was accordingly reformed in Borneo in 1906-7 and in Sumatra in 1907-8 and every kind of foreign money was expelled to the entire satisfaction of everybody concerned: even of the Chinese coolies who were most accustomed to the silver currency! In the special conditions of China it would seem desirable to begin with intentionally admitting the co-existence of the old currency simultaneously with a new gold standard nucleus.

A Stable Gold Unit

The problem is to provide a new gold unit and fix it beforehand at a certain value so that speculation on its future gold par will be excluded. There are three methods by which this could be done. The first would be by bringing into circulation a token coin of an intrinsic value much smaller than its nominal value. This, however, in China would certainly lead to extensive counterfeiting. As an alternative a new silver coin could be issued on a silver basis, but with an intrinsic value of ten to fifteen per cent. less than its nominal value, a tax equal to this difference could then be levied on the production of the silver mines and on all imports of silver in order to raise the price of silver bullion in the country to the same figure. There are, however, disadvantages. The margin of ten to fifteen per cent. might prove to be too small and a rise in the price of silver might compel a reduction of the fine silver content in the token coins. Furthermore there would be the danger of smuggling. The third and most satisfactory expedient would be to have a unit the nominal value of which would be equal to a certain weight of fine gold. This would ensure stability of contract and prices whenever quoted in this new unit. During the introductory period the new unit would only be accepted as a theoretical unit as, for example, the guinea in England and the yen in Japan. Later it might be advisable actually to mint a real coin in silver of the nominal value of this new unit.

The experience of the old Amsterdam Bank of Exchange (Amsterdamsche Wisselbank) and the Hamburger Giro Bank show how a theoretical or fictitious unit may be brought into capital use and become a real unit for the calculation of daily transactions though it be not minted into hard money. The former bank was established by the City of Amsterdam in 1609 to obtain a higher degree of certainty and stability in the settlement of financial transactions. Coins of all kinds and values, including foreign coins, were in circulation and the settlement of debts with distant due dates and of sales of foreign produce caused a great deal of trouble, since the creditor or seller never knew what actual value he was going to receive for his dues. The bank exchanged these various kinds of coins against the real currency of the country at the rate of the day, after deducting a small commission, but they also allowed their customers to be credited in the books of the bank with a certain amount of standard currency into which the different kinds of money paid in had first to be transferred, taking as a unit for their book-keeping the Dutch silver guilder of 10.58 gram fine. This bank guilder remained the unit long after the real coin had passed out of circulation, and the fictitious unit procured absolute stability to all payments. Credit balances were paid out in such coin as the customer wished to receive, the bank guilders being transferred into the kind of coins to be paid out. The

Hamburger Giro Bank was founded in 1619 on nearly the same principle. In China itself such a system is known, as the taels are fictitious units and the "Newchwang transfer" is actually a "bank unit."

A central bank of issue could take the initiative in introducing a bank unit for the whole of China. The bank would have to give its customers the opportunity of opening separate accounts in silver as well as in gold value. Those in silver would for the time being be based on one or other of the existing units, as dollars, silver bars, taels, etc.; the unit in gold will be the new fictitious unit which is based on a gold exchange system. As a matter of course the risk of a rise or a decline in the value of silver must remain entirely with the customers of the bank, since the banking institution could give no guarantee whatever for a stability of the price of silver; such a policy would lead the bank to a speculation in currency, which should under all cases be avoided. Therefore, if a customer brings his money to the bank, he will be credited in some silver account for the amount of dollars or silver bars paid in; and the bank will also pay out of this account in the same value, viz., silver dollars, silver bars, etc.

On receipt of instructions from its customers the bank would make transfers from one kind of silver account to another and it would simplify calculations and save expenses if the gold unit of account were used on such occasions. Transactions with a remote due date would acquire a greater stability if made payable at maturity in the fixed gold unit. The payment itself could if necessary be ultimately effected in silver on the silver basis. In this way the parties who originally transacted the business could begin and settle their business on a fixed gold basis even in a country where the only money in actual circulation is a silver currency (and of course copper) on a silver basis. By acting on these lines the bank would ultimately settle the silver transactions of its customers on a gold basis, though still in a very primitive way. The bank would also have to be prepared to make transfers in the fictitious gold unit from one account to another.

There would be several ways for a customer to create credit balances in such a gold account, viz.:

1.—To pay actual gold into the bank, either on the spot or abroad.

2.—To transfer certain gold values to the credit of the bank, with the bank's agents in one of the large gold centres, as London, Paris, Berlin, Brussels, Amsterdam, St. Petersburg, New York, Tokyo, Batavia, Singapore, etc.

3.—To negotiate a bill of exchange drawn on a gold centre abroad and payable in gold value.

4.—Through a transfer from the gold account of another customer.

5.—By selling to the banks an amount of silver dollars or silver bars with the request to credit the gold account for the equivalent. The bank could then accept this silver, with certain restrictions, either for the purpose of selling it in the market for account of its client, or of acquiring it for account of the government on behalf of the mint; or the bank may prefer to keep the bullion for its own account as soon as it saw its way clear to make purchases and sales of silver a part of its ordinary business without taking to silver speculations.

The Bank would be able to issue notes to bearer, their gold value being secured by offering a redemption in gold value abroad. Such redemption would of course only be for large amounts and private individuals would seldom hold so many of the notes, but they would find that the ordinary banks would be ready to act as intermediaries and this would no doubt be sufficient to maintain the parity of these notes with gold. It would be essential that no government paper money should be issued, but that the central bank should have the monopoly of issuing bank notes. If a fictitious gold unit could be established in China by this means these would be the great advantage that the figure at which the future real gold unit would be adopted would be known and speculations on the gold par and on the value of silver would be avoided. Also there would be the stability that would at once be offered to all contracting parties foreign or Chinese and those who act as sellers or lenders to China, and finally to the government itself. The government would no longer be in ignorance of the actual value of indemnities, salaries and other charges which it has to pay, and taxes it is about to levy. Every kind of business would be based on a fixed value which would no longer be affected by the shifting prices for silver.

The New Unit

The proposals of the Manchu Board of Finance for a new unit to be called a "Yuan," provided for coins down to one-thousandth part of a yuan, which shows that the yuan itself is already considered too large a unit. A large unit tends to raise the price of commodities, salaries, wages under its influence; the cost of living shows a tendency towards a higher level than in countries with a smaller unit. A new unit of one-third of the Kuping tael (instead of about two-thirds as in the case of the yuan) would have many obvious advantages. One of the most important would be that instead of nine kinds of subsidiary coins as proposed there would only need to be three, namely one-tenth, one-hundredth and one-two hundredth of the new unit.

It would be a very dangerous experiment for China to start with a gold exchange standard as a uniform system for the whole country as long as it is quite uncertain what is the real position and strength of China with regard to the balance of trade. Consequently as an examination in this regard would probably take several years it would be wise to postpone the adoption of the gold Exchange Standard as the only existing currency system and to invent a temporary scheme. If such a preliminary scheme could actually be made to operate it would mean the solution of a difficult problem: it would make it possible to adopt at once the principle of a gold or of a gold exchange standard, even before a token currency could be issued and to carry it into effect to some extent already from the first moment; but at the same time it would prevent an exhaustion of the gold stock and of the reserve of gold values, because the old reserves of silver coin and bullion, which it would maintain along with the new gold reserve, would still be especially qualified for the settlement of a temporary adverse balance. As a matter of principle a Gold Exchange Standard would have to be adopted from the very start with a unit of one-third of a Kuping tael, which unit at a silver price of 2s. 8d. would be equivalent to 0.3644883 grams of fine gold. The unit would be known to everyone, but as China is not in a position to stop counterfeiting on a large scale a silver token coin based on the Gold Exchange would not at once be issued. The unit would, however, be immediately used in the books of the central bank; and the other banks, foreign and native, would be earnestly requested to join in this policy. Bank notes would also be issued in the new unit by the central bank against:—*a.*—payment of coins, bars, or any kind of hard cash; *b.*—purchases of bills of exchange which are payable abroad in one of the gold centres, or of telegraphic transfers: in this way it would be possible to convert merchandize into gold; *c.*—credits opened in China against purchases of inland bills, or against advances covered by collateral security. There might be a fluctuation of about one per cent. or a little more on either side of the nominal value of the bank notes, but it is probable that the central bank would have no difficulty in maintaining a policy, whereby it could adequately control the circulation of its own notes their value being maintained by the foreign gold reserve.

The issue of token coins would be the second part of the reform. For reasons already suggested the unit would be one-third of a Kuping tael.

Comparing this coin with the shilling, the Reichsmark, the franc, the Dutch

guilder, the Japanese half-yen and the rupee, we find the following figures :—

	gross weight of silver piece in grams.	fine silver content in grams:	equivalent in fine gold of grams.	giving ratio as from:
Proposed new unit	8.504727	7.6542543	0.3644883	21:1
Shilling	5.65518	5.2310415	0.3661192	14.28:1
Reichsmark	5.55555	5.—	0.35842	13.95:1
Franc	5.—	4.175	0.290322	14.38:1
Guilder	10.—	9.45	0.6048	15.[illegible] :1
Half yen	10.125	8.100	0.3749962	21.6 :1
Rupee	11.663811	10.69182675	0.4882113	21.9 :1

The subsidiary coinage in silver, could be adopted at the corresponding contents of fine silver, but at a fineness of 800/1000. In that case the figures for the subsidiary silver coins would be :

	gross weight in grams.	fine silver content in grams.
½ unit, or 50 cent pieces	4.78125	3.825
⅕ unit or 20 ,, ,,	1.9125	1.53

It would simplify matters if these figures were also rounded off, to which there could be no serious objection, and to make them say:

4.75 grams gross weight and
3.80 grams content o. fine silver, for the 50 cent piece.
and
1.90 grams gross weight and
1.52 grams content of fine silver, for the 20 cent piece.

This would no doubt make coins of a very handy size. It is doubtful whether gold coins would be actually required for circulation for some time to come, but, it would be necessary to keep the necessity in view from the very beginning. Two coins would be necessary, one of ten units, the other of twenty units. The twenty unit piece would have the same gross weight and the same fine gold content as two ten unit pieces.

Particulars of some other gold coins of approaching value are given in the following table:

	gross weight in grams.	fine gold content in grams.	fineness.
New 20 unit piece.	8.09974	7.289766	0.900
English sovereign.	7.98805	7.32238532	0.916⅔
20 Reichsmark piece	7.96495	7.16845	0.900
Dutch 10 guilder piece	6.72	6 048	0.900
20 franc piece.	6.45161	5.80645	0.900
10 yen piece.	8.33325	7.499925	0.900
U. S. $ 5 piece=½ eagle	8.359	7.523158	0.900

RECAPITULATION.

The following is a recapitulation of the main points of the proposed currency reform :

First Period

1. The very first step must be the adoption of a future gold unit as a foundation of the new system, in order to avoid speculation on the announcement of the gold par, and also to avoid that the new unit would later on have to be raised to its future nominal value.
2. The organization of a central bank of issue, or otherwise the reorganisation of the Ta Ch'ing Bank as a central bank for the whole country.
3. The introduction of the new gold unit as a money of account for book credits and book transfers.
4. Securing the co-operation of the foreign exchange banks and of the private Chinese banks and bankers for the introduction of the new gold unit into their bookkeeping.
5. The issue of bank notes based upon the new gold unit.
6. The accumulation of a gold reserve against the aforesaid bank notes.
7. The regulation of the management of this gold reserve.
8. Eventually declaring the bank notes legal tender.
9. To make a close study of the conditions of the balance of trade and of the balance of payments for China.

Second Period

10. The establishment of weight, fineness and alloy of the token coins and of the new subsidiary coinage.
11. The issue of these tokens coins and subsidiary coins, and simultaneously.
12. The accumulation of a gold reserve against the token coins and the regulation of its management.
13. If desirable : the coinage and issue of gold coins. Also, if desirable the temporary admission of some particular foreign gold coins as legal tender, and the temporary issue of gold certificates.
14. The proclamation as unlimited legal tender of:
    a. the silver token coins of 1 unit and 2 units ;
    b. the above mentioned gold coins and eventually the gold certificates.

Third Period

15. The gradual withdrawal and subsequent demonetization of the old silver dollars, as far as necessary of the old sycee and of the present copper cash.

CONDITIONS IN THE PHILIPPINES

MESSAGE OF THE ACTING GOVERNOR-GENERAL

The following is a summary of the Message of the Acting Governor-General of the Philippine Islands (the Hon. Newton W. Gilbert) to the Third Philippine Legislature, delivered at Manila on October 16:

GENTLEMEN: In the absence of His Excellency the Governor-General, it becomes my duty to send to you a message at the opening of the Third Philippine Legislature. Mr. Forbes is still detained at home by reason of impaired health occasioned by his arduous and unselfish service to the people and Government of these Islands. I voice with you the earnest hope that his health may be fully restored and that he may soon be able to resume the duties of the office which he has so ably filled for several years.

I congratulate you, and through you the Filipino people, upon the favorable auspices under which this Legislature begins its work. Tranquillity prevails throughout the Archipelago; progress in every line of endeavor has been marked throughout the year. We are beginning to see the beneficent results of the Government here instituted; results not attained by Americans alone or by Filipinos alone, but by the joint efforts of American and Filipinos, who have shown themselves interested alike in the progress and development of the people. It is but just to pay tribute to the able Filipinos, who, since the inauguration of the present. Government, have devoted the very best that was in them toward the accomplishment of all things which make for progress. Not in Manila alone, but throughout the Archipelago, may be found earnest and able men devoted to the cause of the people and fired with the highest ambitions for the material, mental and moral uplift of those about them. No wonder, then, that with limited revenues and conditions untoward in many respects the results of their labors and ambitions are marked to-day by a condition of well-being and opportunity heretofore unknown in the Philippine Islands.

The utterances of every President of the United States since American occupation have defined the present Government of the Philippine Islands as temporary: to exist only until such time as the Congress of the United States might determine that the Filipino people are prepared to establish a stable government. Although only eleven years have elapsed since the inauguration of civil government—and eleven years is indeed a short time in the life of a people—yet it may be to recount some of the steps that have been taken and something of the progress made toward the redemption of these promises and the culmination of the desires of a large part of the Filipinos.

The American people have regarded certain things as prerequisite to the fulfillment of these promises; universal education, general prosperity, ease of intercommunication, and a molding of all the elements into a homogeneous whole. What have we already accomplished in these directions?

First, a considerable increase in the development of the natural resources. Nature has been lavish in her gifts to these Islands. Modern methods, sufficient capital, and ample labor should make the Philippines as productive as Java, which, with a much smaller area, supports thirty millions of people. Already the exports and imports, which are a considereble index to the prosperity of a country, have increased more than 90 per cent. Wages have risen until they are double or quadruple the wages known before. Receipts in the customhouses have grown constantly year by year, and, while this is only the beginning, it has first a considerable number of the people with the ambition to make the Philippines the garden and granary of the East.

Second, a university has been established as the culmination of the educational system. It has been established upon a broad and liberal foundation. It is manned by capable professors and instructors and young men and women are being equipped to occupy the

highest places in the social, industrial, and governmental life of the Philippines. This university has been liberally supported by the Legislature; but further appropriations must be made in order to place it fully abreast of the universities of other countries. The need now is particularly for buildings and equipment. I recommend that this Legislature provide for the construction of at least one other university building, to take its place in the central university group.

Third, a general educational system was inaugurated in the beginning. More than half a million children are attending school as these lines are written. For several years the average has been nearly as great, so that we can say that between three and four million students have had greater or less advantages in the public schools of the Philippine Inlands. Many private schools are also serving the people. Each year adds to the number of those of mature age who have received some school training. In these modern days every civilized country is developing in democracy. Whatever form this Government may assume, it must be based upon the democratic idea of a government by the people. It is not enough that a few people shall be educated in high school or university, but all should have sufficient general education to enable them to take an intelligent place in the electorate.

Fourth, means of intercommunication have been improved. In a country such as this, composed of many islands and these islands frequently divided by mountain ranges and almost impassable rivers, intercommunication has not been easy. Especially has this been retarded in the days that are past, because of the fact that there was no common language among the people, and so even if people of one section could reach the people of another they had small means of interchange of ideas. Railroads have been built, steamship lines developed, ports constructed, lighthouses erected, and, above all, the children in the public schools in remotest parts of the Archipelago have been taught the same language.

No superiority is claimed for the English language over others which possess literature and a history, except, perhaps, that it is so fast becoming the business language of the world, especially in the Far East, that countries leading in commercial and scientific endeavor have almost universally made its study a part of their public-school system. It is the only language which it was possible to teach generally throughout the Archipelago. Unfortunately, the policy of the previous sovereignty here did not permit the general teaching of the Spanish language, and so it was known by comparatively few. Inasmuch as the ability to use a common language is one of the essentials to the realization of the political aspirations of the Filipino people, it is important to see how far we have progressed in this direction.

At least three million children have had instruction in this tongue. Some of them have already reached manhood and womanhood, and are qualifying as voters because of their knowledge of this language. For many years English has been the official language in all branches of the Government except the courts. This, however, does not mean that the business of the Government has not been very largely conducted in Spanish and in the various dialects.

Until this time Spanish has been the official language of the courts of the Philippines, although under the law English replaces it in January next. Spanish has not been used universally; in fact, scores of languages are used in the courts. I myself had the experience, while sitting on the bench, of having six languages used in the trial of one case. I think this is not unusual. It is not possible, of course, to use English or Spanish or any other language exclusively in the courts. Many lawyers of the Philippines are not able to use English. Large numbers of justices of the peace and a few judges of the courts cannot speak English. Younger men who are being appointed to these positions now, as a rule, can do so. The Filipino has a genius for languages and readily acquires a new one

HON. SERGIO OSMENA

Speaker of the Philippine Assembly

when he chooses. I believe, however, that the Legislature should make provision for the use of Spanish in conjunction with English in the courts, in order that by no possibility will hardship or injustice be done any citizen.

I recommend as earnestly as I may, not that the law be repealed which makes English the language of the courts and thereby postpone the achievement of Philippine desires for more complete nationalization (if I did this I should regard my action as contrary to the desires of the majority of Filipinos and should proclaim myself as an enemy of Philippine autonomy), but that the law be amended so that all safeguards may be provided so as to permit the judge or lawyer or litigant to elect whether in the particular case that is to be tried the proceedings or any part thereof shall be conducted in Spanish. If this recommendation be adopted, the steps already taken toward acquiring a common tongue will not be useless; young men educated in the public and private schools of the Islands will not be disheartened; those who by reason of age or disinclination have not acquired the new tongue will not be discriminated against; justice will be served in every particular, and the gradual adjustment of the language used in the courts will take place of its own force as fast and as fast *only* as the people who have business to transact in the courts are ready to adopt it.

LAW AND ORDER

A gratifying evidence of the development of a feeling of responsibility was given last July when the municipal police assisted by the citizens of Sariaya, Tayabas, repulsed the assault of a band of seventeen armed men upon the town. Too often in the past these armed bands have met no resistance, the people taking their raids as a matter of course; and the fact that the inhabitants of this town were willing to defend their property at the risk of their lives shows that a spirit of stern protection of one's property and individual rights is being developed throughout the Islands.

For its spread and for the protection of their property I earnestly recommend to your consideration legislation which will put permanently in confinement the large number of persons who support themselves by preying upon their fellows.

AGRICULTURE

The campaign against rinderpest has been prosecuted with unceasing vigor and its results are everywhere apparent. This disease is no longer a factor in the industrial economy of the Islands. It still exists, and in widely separated territory, but there are comparatively few cases and their number is constantly decreasing. I confidently expect that an end to the scourge of this disease, which has wrought such destruction to the prosperity of the Philippines, is in sight.

The chief danger now is the possibility of reintroducing rinderpest from abroad. For many years the Government made little progress in its efforts to stamp out the disease, because cattle, coming almost without restriction to the Philippines from the China coast, constantly brought disease into the Islands and no sooner was one epidemic under control than another was reported. It was only when a proper quarantine of animals from ports harboring disease was put into effect that any real progress in the way of ending rinderpest was made; and the most stringent quarantine regulations must be kept in force and scrupulously observed to prevent the landing of infected cattle. Those under which we are operating at present are that cattle from territory exposed to rinderpest must undergo quarantine in the bay for a sufficient length of time to enable the veterinarians to determine beyond any reasonable doubt that the shipment in question is not infected, although we might well follow the lead of the United States and other countries in absolutely prohibiting the importation of cattle from diseased ports.

Too much praise cannot be given the provincial governors and other officials, for their

earnest coöperation in the work against rinderpest. Quarantines are restrictive and undoubtedly work hardship on the people. However, almost without exception, they have shown a disposition to cooperate when the necessity for the quarantine was fully explained to them.

In its work other than combatting animal diseases, the Bureau of Agriculture has just completed the most satisfactory year of its existence. Our efforts now are not so much to conduct scientific experiments as to bring to the knowledge of the people the facts and information which have been collected. This bureau will find its highest usefulness only when it is so thoroughly in touch with the people that it will encourage the farmer to raise two crops of rice a year rather than one, if two are possible; to double the output of his orange farm by grafting new and better varieties on his trees; to sell his hemp for much more by using better methods of stripping; to increase the value of his copra by proper curing; and so on indefinitely. To do this work, which is of fundamental importance to the prosperity of the Islands, demonstration stations are being established throughout the Archipelago as rapidly as money and men are available. I believe that this work should be continued and extended so that we will have at least one demonstration station in each province, the employees of which will be in the closest relations with the agricultural life of the community. To this end there is requested this year a considerable increase in the appropriation for the Bureau of Agriculture and I earnestly recommend it to your study and consideration.

ECONOMIC CONDITIONS

During the past twelve years there have been imported into the Philippine Islands more than 2,485,000 tons of rice, for which there were sent, largely in coin, to foreign countries a little less than P165,000,000. This, of course, is an exhausting drain on the resources of the Islands, and it is not now, nor can it for years be, offset by manufactures. To raise what we consume it will be necessary to increase our crops of grain in ordinary years between two and three hundred thousand tons.

There are in many parts of the Islands large tracts of the most fertile land suitable for the growing of rice or maize, which belong to the Government and which, up to this time, have never been cultivated. It seems to me that the Government might well engage in the development and cultivation of some of these areas. There are to-day many thousands of families engaged, as were their forefathers before them, in a hopeless struggle on small parcels of exhausted soil where they barely eke out an existence, contributing nothing to the wealth of the Islands. If they could be transferred from their present environment to these large, fertile tracts, their present negative influence upon Philippine progress would be changed and they would soon be contributors in their full share to the development of their country.

I desire to recommend to the thoughtful consideration of the Legislature a plan which attempts the development of some of these areas upon as large a scale as may seem wise, for the twofold purpose of increasing the food supply of the Islands and of encouraging immigation of people from the more populous and sterile districts into those parts of the Archipelago where nature has been most bounteous in her gifts. Such tracts of land may be found in various parts of the Archipelago, some of the best of them being in the Island of Mindanao; and I would like to suggest what seems to be sometimes forgotten, that the Philippine Archipelago consists not of Luzon and the Visayas alone, but of Luzon, the Visayas, and the Moro Province. Tracts may be found within the Moro Province which are easily accessible, below the belt of severe storms, requiring no irrigation, where two crops of rice may be raised each year, and where, if such a station were established, the influence of the more northern Filipinos would soon become a dominant factor. Let it not be said that the Philippines are dependent upon the outside world for food. Let this great drain upon the resources of the Philippines cease, and relieve the congestion and the consequent poverty which prevails in certain parts of the Archipelago. There is yet remaining P116,000 in the so-called congressional relief fund, which could well be used for this purpose if the Legislature shall determine that such a policy should be adopted. A considerable additional amount should be appropriated in order to give the proposal a real opportunity for success and to make the project of sufficient magnitude so that its beneficial results may be really felt.

I feel that this a matter of great importance, the purpose being twofold: that of encouraging interisland migration and of providing a larger supply of food for the people. I request your earnest and thoughtful consideration of the matter.

RAILROADS

Railroad construction has continued to progress steadily during the year in the Island of Luzon and the effect in stimulating industry and fostering production, especially in the copra-producing provinces, has been marked.

The Manila Railroad during the year has opened its lines to the following points; Candelaria, on the Manila Line South; San Jose to Batangas and Batangas to Bauan, on the Batangas Line; Pagsanjan, on the Calamba-Santa Cruz Line; Rosales, on the Paniqui-Tayug Line; Naic, on the Naic Line; and South Aringay, on the Dagupan-San Fernando, La Union Line.

ABANDONMENT OF RAILWAY CONSTRUCTION ON THE ISLANDS OF NEGROS AND PANAY

After a thorough study of conditions in Negros, our officials and engineers are conclusively of the opinion that at the present it would be highly inadvisable to permit the Philippine Railway Company to construct the railway proposed for that Island. It appears that the cost of construction would be approximately P8,500,000, with an annual interest charge of P340,000 which the company would probably not be able to meet and which the Government would consequently be called upon to pay. Similar conditions attach to that portion of the concession which provides for a railway from Dao to Batan Bay on the Island of Panay. The Philippine Railway Company is also of opinion that these two lines could not be made to pay for a long time to come and is ready to waive its concessions for them. Drafts of proposed laws to accomplish this purpose were submitted by the Committee on Railroads to the Assembly at its last session and will be found in its files as Assembly Bills Nos. 942 and 1057. I recommend them to your careful consideration, in order that we may not be called upon to meet this probable expenditure for which we would receive no compensating return.

EVIDENCES OF COMMERCIAL AND FINANCIAL ACTIVITY

The following figures are interesting as showing the increase in trade with the United States since the passage of the Payne Tariff Bill, 1909, the increase in trade with other countries, and the increase in both business and trade during the same period:

Fiscal year.	Trade with foreign countries.	Trade with the United States.	Total trade.
1909	P87,772,324	P29,905,556	P117,677,880
1910	94 387,348	59,183,832	153,571,.80
1911	105,959,292	73,265,410	179,224,702
1912	124,959,188	84,780,444	209,739,632

Business of the Philippine Islands upon which is levied a tax of one-third of 1 per cent:

Fiscal year.	Amount of business.
1909	P380,408,894
1910	457,610,200
1911	533,650,738
1912	574,168,706

These figures show a total increase in the three years of P189,501,874 in trade and P424,202,962 in business in the Philippine Islands. When the Payne Tariff Bill went into effect it was believed that there would be a marked decline in the customs receipts owing to the free American market which would tend to cut into the foreign markets, from which alone goods are received on which customs duties are paid. The contrary has proved to be the case. Customs receipts have advanced steadily the past three years, amounting to P16,572,147 in 1910, P17,357,620 in 1911, and P18,695,295 in 1912. Not only do the merchants import more and more from the free markets of the United States every year but with increasing prosperity the purchasing power of the people has become so much greater that they can afford to increase their purchases of foreign dutiable goods.

REVENUES

The customs receipts, which the Insular Collector of Customs at the beginning of the last fiscal year estimated would suffer a decrease of approximately a million pesos, in fact showed an increase of P1,271,452 over the previous year. The estimate of the Collector of Internal Revenue of an increase of about P600,000 over the receipts of the previous year proved very conservative, P1,189,669 being in fact the figure for the increase in his collections. The total actual revenue for the fiscal year was P27,275,668.61 instead of the estimated P25,072,300.

Up to date, in the present fiscal year the revenues from both customs and internal revenue have shown a regular increase, the figures for the first quarter showing an increase in customs receipts of P1,200,284 over that of last year and the internal revenue showing an increase of P352,700 over the corresponding period of the previous year.

FINANCES

The following is taken from the report of the Governor-General to the Commission and shows the financial workings of the Government for the fiscal year 1912:

The year was begun with P447,332.37 cash available for appropriation and P593,500 which, although appropriated from funds of the previous fiscel year for permanent improvements, was appropriated subject to release by the Governor-General. Therefore, the latter sum which had not been released was considered as actual cash available in the treasury and a portion of the reserve, making in all the sum of P1,040,832.37 cash reserve.

The estimated resources for the year were P26,326,989.31 and the estimated liabilities were P25,406,949.55. Of these liabilities P19,468,-449.11 were for current expenses and P2,542,452 for permanent improvements. In all the grand sum of P6,501,192.42 was appropriated by the Legislature for permanent improvements from the funds available for the fiscal year 1912. As it was apparent that the finances of the Government could not stand such a large appropriation, P4,854,500 of this sum was appropriated subject to the release of the Governor-General. During the year the receipts from the customs and internal revenue exceeded the estimates, and P3,397,027.65 were transferred into the general fund of the treasury and made available for expenditure by the gold-standard fund Act. At the end of the year therefore P31,247,673.39 represented the revenues and receipts of the Government, an increase of P6,011,016.45 over the estimates.

Expenditures.—The total expenditures of the Insular Government for the fiscal year, were P30,208,761.50, as compared with P28,505,721.41 of the previous fiscal year, an increase of P1,703,040.09. Of this total amount, P29,786,-832.55 was from the general revenue funds as compared with P27,988,227.38 of the previous year, an increase of P1,798,605.17, and P421,-928.95 from the bond fund, as compared with P517,494.03 of the year before, a decrease of P95,565.08.

Current expenses.—The current expenses of the Insular Government for administration, operation, and maintenance were P18,768,317.27, as compared with P17,143,635.86 of the prior year, an increase of P1,624,681.41. This increase was due in large part to the increase

in expenses incident to the opening of the general hospital, the salaries of the justices of the peace, the rinderpest campaign and the purchase of rice which accounts for P1,119,493.

Aid to provinces, municipalities, and cities.—During the fiscal year the Insular Government gave aid and contributions to provinces, municipalities, and cities, for their general administration, in the amount of P1,654,830.75, as compared with P1,664,727.03 of the previous year, a decrease of P9,896.23.

Interest and sinking-fund payments.—The fixed charges of the Insular Government on account of its bonded debt, being interest on the friar lands and public works bonds and the allotments to the sinking funds, were P900,773.97, as compared with P1,102,782.08 of the year before, a decrease of P202,008.11; P141,430.85 of this decrease is accounted for by a reimbursement payment during the fiscal year 1911 to the friar lands bond sinking fund.

Interest on railroad bonds.—Under guaranty contracts the Insular Government paid the net sum of P525,422.69 on railroad bonds, as against P766,946.65 for the year before, a decrease of P241,523.96 which is accounted for by repayments made by the companies during the last year.

Permanent improvements.—During the fiscal year the total amount of expenditure for permanent improvements was P8,359,416.82, as compared with P7,827,629.79 of the prior fiscal year, an increase of P531,787.03. Of this amount, P7,937,487.87 was from the general revenue funds, as against P7,310,135.76 for the previous year, an increase of P627,352.11, and P421,928.95 from the public works bond fund, as compared with P517,494.03 of the year before, a decrease of P95,565.08. Of the total amount from revenue, viz: P7,937,487.87, the sum of P4,259,378.52 was on account of Insular outlays, and P3,678,109.35 was allotted to provinces and municipalities.

Statement of receipts and expenditures, fiscal year 1912, and resources at the beginning and end of the year.

Resources, July 1, 1911:		
Cash on hand available for appropriation	P447,332.37	
Appropriated from revenue funds, fiscal year 1911, for permanent improvements, not yet released by the Governor-General	593,500.00	
		P1,040,832.37
Appropriated from revenue and available		9,926,931.34
Cash on hand appropriated from proceeds bond sale		701,487.08
Supplies on hand		5,510,862.15
Total resources, July 1, 1911		17,180,112.94
Revenues and receipts:		
Customs		P17,816,247.28
Inter al revenue		9,459,421.33
All other receipts		3,972,004.78
Total revenues and receipts		31,247,673.39
Expenditures:		
Current expenses of the Insular Government		18,768,317.27
Aid to cities, provinces, and municipalities		1,654,830.75
Interest and sinking-fund payments—bonded debts		900,773.97
Interest on railroad bonds—guaranty contracts		525,422.69
Permanent improvements—Insular	P4,259,378.52	
Allotments to provinces and municipalities	3,678,109.35	
Total from general fund revenues	7,937,487.87	
Insular from bond fund	421,928.95	
Total for permanent improvements		8,359,416.82
Total expenditures		30,208,761.50
Transfers and adjustments of supplies:		
Supplies transferred to equipment (Bureau of Education)	P1,212,794.18	
Supplies dropped from account	40,191.13	
		1,252,985.31
Resources, June 30, 1912:		
Cash on hand available for appropriation	P1,404,689.95	
Appropriated from revenue funds, fiscal years 1911 and 1912, for permanent improvements, not yet released by the Governor-General	1,681,038.88	
		3,085,728.83
Appropriated from revenue and available		8,286,064.50
Cash on hand appropriated from proceeds bond sale		279,558.13
Supplies on hand		5,314,688.06
Total resources, June 30, 1912		16,966,039.52

Under the authority given by section 4, Act No. 1989, the Secretaries of the various Departments have authorized the use for permanent improvements of the following sums appropriated for current expenses:

1909	P260,673.72
1910	1,052,229.02
1911	503,388.36
1912	763,224.78

The estimates for the present fiscal year are as follows:

Fiscal year 1913.

RESOURCES.

Reserve:		
Cash available for appropriation June 30, 1912	P1,404,689.95	
Appropriated from funds of fiscal years 1911 and 1912 for permanent improvements by Acts Nos. 1988 and 2059 unreleased by the Governor-General June 30, 1912	1,681,038.88	
		P3,085,728.83
Estimated revenues		28,835,000.00
Total estimated resources		31,920,728.83

LIABILITIES.

Fixed charges		P2,913,288.44	
Permanent improvements:			
Continuing not subject to release by Governor-General	P1,000,000.00		
Appropriated fiscal year 1913, released by Governor-General	500,000.00		
Appropriated fiscal years 1911 and 1912, and released by Governor-General	1,098,985.27		
Current fiscal year 1913 appropriations, Acts Nos 2185, 2187, and 2189	434,000.00		
Restoration for irrigation systems from P750,000 reverted fiscal year 1912	250,000.00		
		3,282,985.27	
Current expenses:			
Continuing appropriations	P617,975.03		
Fiscal year 1912 appropriations and allotments	18,634,127.27		
Restorations of prior year reversions	814,677.10		
		20,066,779.40	
Total estimated liabilities			26,263,053.11
Estimated balance provided no further amounts are released or restored by the Genernor-General:			
Appropriated from funds of fiscal years 1911 and 1912 not yet released by the Governor-General, October 8, 1912		582,053.61	
Available for appropriation from the general fund		5,075,622.11	
			5,657,675.72

As shown by the foregoing statement, the estimated Insular revenue for the fiscal year 1913 is P28,835,000. The Collector of Internal Revenue estimates that the receipts of his office during the year will be P10,000,000, an increase of about P540,000 over the receipts of last year. The Insular Collector of Customs at P17,500,000, which is a decrease of about P316,000 from the actual receipts of last year.

The total appropriations and restorations for current expenses for the present fiscal year amount to P20,066,779, and the appropriations for fixed charges amount to P2,913,288. P1,250,000 of the fixed charges is the annual contribution of the Insular Government toward the expenses of the city of Manila, and P110,000 is its contribution toward the expenses of the city of Baguio. The other fixed charges are interest on bonds of the Insular Government issued for public works and permanent improvements and guaranteed interest on bonds issued by the railroads. The total appropriations for public works and permanent improvements for the fiscal year 1913 amount to P1,934,000, all of which are to be paid out of the current revenues of the present fiscal year. P1,500,000, of this are the continuing appropriations under Acts 1854, 1988 and 2059 for barrio school buildings, roads and bridges and irrigation systems. In addition, the sum of P582,053.61 has been appropriated for permanent improvements from funds of the fiscal years 1911 and 1912 which have not yet been released by the Governor-General.

The Commission in its exclusive capacity has passed appropriation bills for current expenses of P703,134.27 and for public works and permanent improvements P434,000.

INSULAR AUDITOR'S REPORT OF THE PROPERTY OF THE BUREAU OF PUBLIC WORKS.

The popular and ever increasing demand for good roads and public works of all sorts and the large appropriations made available at that time necessitated the very rapid expansion of the Bureau of Public Works in the years 1907 and 1908. The organization was badly prepared to meet this situation and although the engineering personnel was extended as rapidly as possible, the provisions for the proper handling of the property and accounting problems incident to the enormous increase of work were entirely inadequate. The then Director of Public Works realized the danger of this situation and requested the Insular Auditor to make the necessary investigation and to prepare an adequate system of accounting to meet the needs of the Bureau. From that time, until December, 1910, the accounting division was under the direct charge of the Insular Auditor, who was endeavoring to straighten out and systematize the accounts and the property affairs of the Bureau. In the meantime the lack of system necessarily increased the cost of operation of the Bureau and of the public works which were under way. In November, 1911, the Insular Auditor began an examination of the property of the Bureau, on which he made a report to the Chief Executive in the latter part of August, 1912. The result of this investigation shown that the property shortage in the Bureau of Public Works is considerably less than had been estimated by the Bureau itself. In view of the changes in the personnel since 1907 and the inadequate accounting system of the Bureau it is impossible definitely to place the responsibility for this shortage, and the Auditor so reports. It appears that probably the entire shortage occurred prior to the incumbency of the present Director of Public Works. This shortage will ultimately require legislative action, but as it appears that there may be much of the property of the Bureau in the provinces which has not been checked, orders have been given to make the utmost endeavor to locate it, and until this investigation is completed a definite recommendation can not be made.

LOANS TO RAILROAD AND TO PROVINCIAL AND MUNICIPAL GOVERNMENTS.

At its last session the Legislature, having before it the uniformly excellent results had from the loans made from various trust funds of the Government, passed Act No. 2083, which authorizes the investment of 50 per cent of the gold-standard fund in loans to provincial and municipal governments for periods not exceeding ten years for the construction of public works. It also authorized the temporary investment of one-half of such 50 per cent for periods not exceeding thirty months in loans to the Manila Railroad Company on approved security, in order that the construction of railway lines in the Provinces of Tayabas, Camarines, and Albay may be facilitated.

At this time the authorized investments aggregate P6,155,229.94 in provincial and municipal loans, and P700,000 in loans to the Manila Railroad Company.

The present policy of investing trust funds in loans to provincial and municipal governments has now been in practical operation for more than five years, and it may be stated without qualification that the results have been so uniformly advantageous as to confirm the wisdom of the legislation by virtue of which these investments

have been made. It is noteworthy that in no instance has any provincial or municipal government defaulted in either principal or interest payments on these loans nor has any instance come to my knowledge in which the expenditure of the funds has failed to produce satisfactory results to the taxpayer.

AGRICULTURAL BANKS.

One of the crying needs of the country is to provide a way in which agriculturists can obtain money for financing their crops. This was brought to the attention of the last Legislature, which provided, by Act N. 2124, for the establishment of a mortgage bank in addition to the Government Agricultural Bank provided by Act No. 1865 In the first section of said Act is the provision that the franchise is granted, provided that "within the period of six months from the date of approval of this Act (February 1, 1912), which period may be extended to one year by the Governor-General if in his opinion there are reasonable grounds therefor, said Mauro Prieto and his associates shall organize a corporation in accordance with the laws of the Philippine Islands." Certain difficulties which apparently could not be overcome presented themselves to the organizers of this bank, so that they could not comply with the terms of the law. Request was therefore made on July 26 for an extension of six months within which the corporation might be organized. With the idea that this was a matter which properly should be brought to the attention of the Legislature, I extended the period until November first in order that if at that time the prospects of the grantees of this franchise being able to provide the necessary capital for this bank were not good, the field would be open for other possible investors and the Legislature could take such action as it might deem fit. I have the honor to place this matter before you and to recommend that earnest consideration be given to the question of the incorporation of a bank or banks for such purpose. It is my firm belief that everything possible should be done to encourage agricultural banks to incorporate in the Islands, and I invite you to thoroughly consider this matter.

THE SALES AGENCY.

The Philippine Commission on April 10, 1911, passed Act No. 2061, for the creation of a sales agency to facilitate the manufacture and sale of products of people under the exclusive legislative jurisdiction of the Philippine Commission. The work of organizing this agency and providing buildings, machinery and methods for conducting it has necessarily been slow and therefore we are only now ready to obtain results. With the establishment now of the School of Household Industries, with a large amount of enthusiasm being shown in many provinces for the development of these activities, with the instruction in many forms of artistic labor that is being given in the public schools, it seems that this agency, created for a much smaller purpose, might well receive the support of the Philippine Legislature and be made the medium through which to develop a large trade in products manufactured in the homes of the people at times when they are not engaged in their ordinary pursuits or by members of the family who are not otherwise employed. This should guarantee to the producer a more equitable share of the value of his labor. An appropriation of P50.000 by the Legislature, to enable the Sales Agency to undertake this work, would, I believe, result in great benefit to the people, and I recommend it to your careful consideration.

Wireless in the Philippines—The government is contemplating the erection of a large and up to date central wireless station in Manila. The station with all appurtenances is to cost in the neighborhood of P.100,000 and will be connected with all the wireless stations in the Philippines.

DEVELOPMENT OF THE LOAN SITUATION

The protest lodged with the Chinese Government on October 29 by the representatives of the eleven Powers at Peking, parties to the Peace Protocol of 1901, disapproving the action of China in hypothecating a portion of the Salt Gabelle which has been pledged as a whole for the repayment of the Boxer Indemnity, has caused the Government to review its action. According to Reuter's correspondent at Peking the Government regrets that its determination to pay monthly a portion of the Salt Gabelle revenue to the Chartered Bank, which was intended as evidence of good faith towards the supporters of the Crisp Loan, appears to have had the opposite effect. The Government acknowledges that the protest appears to be unanswerable and that if the protest is upheld China will find other security for the Crisp loan.

Major Barnes, representing Birch Crisp and Company has arrived in Peking to investigate conditions, and it is possible that he will learn much that was not quite clear in London.

In answer to a series of questions on the subject of the Chinese loan, in the British House of Commons, on October 28, Mr. F. D. Acland, Under Secretary for Foreign Affairs, said that the Imperial Government regarded the negotiations between China and the Six Power Group as being merely in abeyance. The Government was not prepared to support other parties desiring to lend money to China.

He added that the papers with regard to the negotiations by the Six Power Group would be laid on the table on the morrow, and that the Sextuple Group held that China was still bound by the agreement concluded on March 9 and reaffirmed on May 17.

The following is the agreement of March 9 referred to by Mr. Acland. It was exclusively published in the special Revolution Number of the FAR EASTERN REVIEW in April last, and is now reproduced as a matter of interest and for general information:

REPUBLIC OF CHINA
Office of the President,

Peking, March 9th, 1912.

To E. G. Hillier, Esq., C. M. G., Agent, Hongkong and Shanghai Banking Corporation, Monsieur Casenave, Manager, Banque de l'Indo-Chine, H. Cordes, Esq., Deutsche-Asiatische Bank, and Willard D. Straight, Esq., Special Representative, American Group.

Gentlemen:—

I am in receipt of your letter of to-day's date informing me that, having obtained the sanction of your Governments to advance to the Chinese Provisional Government funds for their urgent requirements, as stated in the letter of the 2nd March addressed to you by the Acting-Minister of Finance, your Banks are now prepared to hold at the disposal of the Chinese Provisional Government, against the receipts of the Ministry of Finance, the sum of Shanghai Taels One million one hundred thousand (Shanghai Taels 1,100,000) and I note the arrangements proposed for making this sum available.

It is understood and agreed,

1.—That the said advance of Shanghai Tls. 1,100,000 will be treated in conjunction with the advance of Shanghai Tls. 2,000,000 made in Shanghai to the Chinese Provisional Government on the 28th day of February last, and that sterling exchange for the same will be settled by the Banks in Shanghai to-day.

2.—That this advance of Shanghai Tls. 1,100,000 as in the case of the previous advance of Shanghai Tls. 2,000,000 above referred to, will be covered by delivery to the Banks, so soon as arrangements permit, of sterling Treasury Bills bearing date the 9th day of March, 1912, and for such amounts as, after being discounted at a rate to be arranged, shall yield the sterling equivalent of the said advance, the said Treasury Bills to be secured, subject to the existing charges, upon the revenue of the Salt Gabelle.

3.—That the Banks hold a firm option for the provision of the further monthly requirements of the Chinese Government for the months of March, April, May, June and possibly July and August which the Four Groups have already been requested to finance, against the delivery of additional sterling Treasury Bills on terms to be arranged.

4.—That in consideration of the assistance rendered by the Groups to China in the present emergency and of their services in supporting her credit on the foreign markets, the Chinese Government assures to the Groups (provided their terms are equally advantageous with those otherwise obtainable) the firm option of undertaking the comprehensive loan for general reorganisation purposes already proposed to them, to be floated as soon as possible, and to be applied in the first instance to the redemption of the sterling Treasury Bills aforesaid.

I hereby confirm the arrangements and conditions above stated, and request you to proceed immediately in accordance therewith.

I am, Gentlemen,

Yours faithfully,

(Signed) YUAN-SHIH-KAI
(Seal)

Some extremely interesting correspondence relating to the Chinese loan negotiations, including telegrams between Sir Edward Grey, Secretary of State for Foreign Affairs, and Sir John Jordan, British Minister at Peking, has been published as a Parliamentary paper. While this correspondence is too long to reproduce, and in any event mainly covers the ground we traversed in our October issue, it is interesting to note that the official account of the negotiations between Mr. C. Birch Crisp and the Foreign Office, differs materially from that given by Mr. Crisp in interviews and in the speech delivered at the meeting of the Anglo-Russian Bank. Mr. Crisp would appear to have given an undertaking which he did not carry out. This Sir Edward Grey states politely, but specifically. Moreover there is no reference in the correspondence to the alleged request for a letter from the Foreign Office to Mr. Birch Crisp intimating that for "reason of state" he had better not proceed with the loan. There is, consequently, reasonable ground for doubt whether Mr. Crisp's memory was not defective in this, as in regard to the undertaking he gave to the Foreign Office on September 10.

At the movement of writing there seems to be a fair prospect of a *modus vivendi* being arrived at, between China and the Six Power Group, but as the situation changes almost daily it is, of course, possible that matters will wear a different aspect when this number of the FAR EASTERN REVIEW is published.

TIMBER

Zamboanga Timber Concession.—A concession of timber land containing approximately 60,000 acres was granted on Oct. 31 by the bureau of forestry. The tract is situated in the district of Zamboanga, Moro province, on the north coast of Dumanquiles Bay. The concession is in the form of a twenty year exclusive license agreement. Machuca Go Tauco, of the Manila Saw Mill, was the successful bidder who was awarded the privilege.

Ambos Camarines Concession.—Acting Director of Forestry W. F. Sherfesee has announced the granting of a new timber concession in the Philippines, which, under certain conditions, will involve a capital investment of not less than P.1,100,000. The forest tract is situated in the provinces of Tayabas and Ambos Camarines, bordering on Ragay Gulf. It was advertised for competitive bids several months ago, and the award was finally made to Mr. E. J. Lane who has associated with him in the enterprise capitalists and timber operators in British Columbia and in the northwestern part of the United States.

FAR EASTERN RAILWAYS

RAILWAYS IN THE PHILIPPINES

ANNUAL REPORT OF THE SUPERVISING RAILWAY EXPERT.

The report of the supervising railway expert for the fiscal year ended June 30, 1912, indicates a total of construction on all railway lines for the year of 54.3 kilometers graded, 70.3 of track laying, and 105.1 of line opened. The total represents activity on the Manila Railroad Company's lines as on the Philippine Railway Company's lines, construction was. practically, closed in March, 1912.

The total kilometrage of lines in the Islands authorized constructed amounts to 1,785 kilometers; constructed and in operation, 1,034 kilometers; constructed and not in operation, 16 kilometers; to be constructed 734.

The Manila Railroad Company has an authorized kilometrage of 1,306, all of which is in Luzon. Of this 725 kilometers have been constructed and in operation; 16 kilometers have been constructed and not in operation at the end of the fiscal year, and the company has 564 kilometers to construct.

The construction on the Baguio line from Aringay included grading from the Aringay end for 10 kilometers and for seven kilometers from the Baguio end. On this line twelve kilometers of track will be required.

On the main line south a considerable portion of the location between Lucena and Callauag, Tayabas, on the east coast was completed in 1912. On June 30, construction was under way at Hondagua, the east coast port of Lopez. A grade of 1.2 per cent has been obtained between Lucena and the Gulf of Ragay and beyond that point to Nueva Caceres it may be impossible to secure so light a grade.

To complete its line as per contract the Manila Railroad Company will have to lay 91 kilometers of track yearly as the date of completion is 1918.

Bonds to the total of $2,996,000 for the southern lines of this company were approved on July 1, 1911, and again on October 18, 1911 additional certificates to the amount of $940,000 were authorized and on January 22, 1912, $1,000,000 were authorized making a total of $4,936,000 U. S. currency. These bonds cover 229 kilometers of line in full commercial operation and represent a cost per kilometer of about P43,110 or $34,688 U. S. C. a mile. Since 1910 net earnings on the southern lines of the Manila Railroad Company have been sufficient to pay all fixed charges and leave a considerable surplus to the company.

On the Northern lines there were 441 kilometers of track in operation against 409 in 1910. For the calendar year ended December 31, 1911, the operating revenue amounted to P2,833,047.81, an increase of P338,362 over the previous year while there was only an increase in track of 32 kilometers. The operating expenses amounted to P1,257,158.20, an increase of P184,186.73. The percentage of operating expenses to gross operating revenue was 45 against 43 for the previous year.

The equipment was increased during the year by eight third class passengers cars, three combination coaches, 76 freight cars, while there was a reduction of 29 company service cars. The equipment included 64 locomotives, 156 first, second, third combination and parlor cars, 770 freight cars and 127 in company's service.

On the Southern Luzon lines of this company there were 111 kilometers in operation on December 31, 1910, and 128 in operation on the last day of 1911. The operating revenue amounted to P761,850 for the calendar year ended December 31, 1911, an increase over the previous year of P559,980.

The operating expenses amounted to P409,266.53, an increase of P218,124 and the percentage of operating expenses to gross revenue 46.3 as against 67 the previous year, a reduction of 20.7.

The equipment of the Southern Lines was increased by five locomotives, 13 passenger cars and 51 freight cars during the year. The equipment now comprises 26 locomotives, 59 passenger cars of the different classes, 241 freight cars and 124 in company's service.

The Philippine Railway company's lines in Cebu represent an outlay of $3,317,000 or a cost of $69,394 a kilometer or $55,842 a mile. The line in Panay cost to the end of the fiscal year $5,065,000, $87,102, a kilometer or $63,645 a mile. The average cost a kilometer for the roads on both islands was $79,113 a kilometer or $63,645 U. S. C. a mile.

At the end of the fiscal year 1912 the government had paid out in interest on the guaranteed bonds of this company, P2,241,828. Of this amount there has been returned from the net earnings of P47,691, leaving a balance due the government of P2,194,136. Another payment of P58,073 was made since the completion of this report.

This railway operates 98.83 kilometers in Cebu and 118.74 in Panay, a total kilometrage of 217.57.

The operating revenues amounted to $773,940.90 and the operating expenses P596,848.40 leaving a net operating income after paying taxes of P179,799.

The total fixed charges including interest, betterments, reserves amounted to P734,439.55 showing a corporate deficit of P554,640.34.

The equipment for the lines was increased by five passenger cars and 37 freight cars. It now consists of 15 locomotives, 50 passenger cars, 192 freight cars and seven cars in the company's service.

THE REPORTED BELGIAN RAILWAY LOAN

Much speculation has been caused by the announcement of the arrangement of a loan for £10,000,000 between the Chinese Government and a Franco-Belgian syndicate for the construction of a railway between Honan-fu, the present terminus of a short line running east to Kaifeng-fu, and Sian-fu, with an extension north-westwards to Lanchow-fu, capital of Kansu Province, and an extension eastwards from Kaifeng-fu to the present undeveloped port of Haichow-fu on the coast. Such a line would cross the Pukow-Tientsin line about Hsuchow-fu, following the old bed of the Yellow River from near Kaifeng.

A Chinese Company has already constructed about thirty miles of line to the westward of Honan-fu, and it is practically ready for traffic. Thence the line will strike to Kansu and traverse some of the richest agricultural land in China. At present all merchandise is borne on mule back, and so difficult are the unkept routes through the loess and over the mountain passes and so great the traffic that the caravans suffer continuous heavy losses in animals. The bleaching bones of mules mark the whole way to the western country.

The region is described as the Switzerland of China, and possesses remarkable scenic beauty, as well as abundant material wealth.

The engineering difficulties all appear on the western section of the line. To the east of Kaifeng there are practically none. It is level country, with a route already marked by the old Yellow River. On the west any line will no doubt take the old cart road towards Shensi, by way of Tungkuan, across the province by Sian-fu, and up the valley of the Wei river. Carts travel about 1,000 miles from Honan by this route.

This line has been on the tapis for a long time, and the Compagnie Générale de Chemins de Fer et de Tramways en China, the Belgian organisation now negotiating for it, already had it laid down in the contract they entered into with China for the construction of the railway from Kaifeng to Honan, that they should have the option to make a loan for a line to Singan-fu, and that would surely lead them to bend every effort to acquire the right to build to Lanchow-fu and onwards. In Article 23 of that agreement it is set forth that "Should the Compagnie Générale de Chemins de Fer et de Tramways en Chine finish satisfactorily the work for the railway from Kaifeng-fu to Honan-fu, complying strictly with all the provisions of the present contract, and should the Chinese Government decide to extend the railway from Honan-fu to Singan-fu the Director General of the Imperial Chinese Railway Company agrees to come to an understanding preferably with, and to grant an option for the loan necessary for the said undertaking to, the Compagnie Générale de Chemins de Fer et de Tramways en China in conformity with the provisions and conditions of the present contract."

Nothing definite has been disclosed as to the terms of the new agreement. It is stated, however, that £2,000,000 was to have been paid up and that the money was to have been used by China for administrative purposes and not for the construction of the railway. Such an action would necessarily invoke a protest from the Governments of the countries wherein the bonds would be offered, and France did not hesitate to issue a notification that the loan would not be permitted to be listed on the Bourse. This precaution on the part of France in itself seems to have delayed the conclusion of arrangements.

With regard to the building of the section to the west of Honan-fu, mentioned above, it is interesting to note that it is portion of a section being built to Jung-kwan—the contract for the supply of the materials, bridges, equipment, workshops, &c., delivery of which commenced nearly two years ago, being held by Griffiths, Beddoes and Bray, Ltd.

The road-bed laid for some 30 miles from Honan-fu is being constructed entirely under Chinese supervision, Mr. Jeme Tien Yu acting as consulting engineer on behalf of the company, no foreign control being allowed. The cost of construction is being met out of the proceeds of an extra charge on the Chang-Lu salt likin authorised by Imperial edict. Several millions of taels have been collected from this source during the past three or four years, and expended on the construction.

"It is impossible" writes a representative of the contracting firm, to a London paper, "That the Belgians can obtain security on this section of the railway without reference to us, as we hold a first mortgage on the rolling stock and also a lien on the salt likin set aside to meet the expenses of construction.

"There appear a number of financiers anxious to enter into loan arrangements in China, who are satisfied with securities which have already been hypothecated, and it behoves merchants who have entered, into agreements with the Chinese under the old Manchu regime to keep a wary eye on securities that have been pledged to them."

As bearing on the above the following advertisement which appeared in the north China papers in November, and will be found in our advertising columns, is of interest:—

The Chinese Government hereby reminds the Public that the Lotung Railway Company (商辦洛潼鐵路公司) holding the concession for the building and working of a railway between Honanfu and Tungkwan is a private concern whose business transactions, viz the engagements of the company relating to the purchase on credit of material and supplies for this railway, not having been approved of by the Chinese Government the latter in no case hold themselves responsible for same.—The Ministry of Communications, Peking.

The *London and China Express*, in referring to the proposed loan, says:—It would appear that an old-standing agreement with the Belgian syndicate for the construction of a

railway from Honan to the west has been revived. The loan will not be issued until next year. The actual date of the signing of the agreement was Sept. 18, and in one of the clauses thereof Belgium, in consideration of the concession for the two proposed lines just mentioned, agrees to cancel the concession granted in 1903 for the Pien-Lo line. The proposed lines, which are of great commercial importance, will be longer than the Peking-Hankow system. The Assembly has sanctioned the loan, and expressed its confidence in Belgian ability to bring the work of building the lines to a speedy conclusion.

In connection with the proposal to make Haichow a port (which desire on the part of China is to have a port of her own which may in a measure counteract the growing influence of Tsingtau) it is interesting to note that German authorities observe that unless a colossal amount of expenditure is defrayed for a period of at least twenty years to come, Haichow will scarcely make as much advance as Tsingtao, and thus the German interest will in no way be effected by the construction of the line. Nor, they declare, will the Tsingtao line, if extended in future, run counter to the interests of the Chinese railway, since Germany has at present no intention of constructing any railways in Shantung Province.

KIRIN-CHANGCHUN RAILWAY

The Kirin-Chungchun Railway was opened for passenger and goods traffic on October 21st last. As its name indicates this line connects the city of Kirin, the capital of Kirin province, Manchuria, with Changchun, the point of junction of the Japanese and Russian systems in Manchuria.

The railway is 78 miles long. By the treaties between China and Japan signed in 1907 and 1908 the Japanese Government was to furnish 2,150,000 *yen* through the South Manchuria Railway Co., as a portion of the estimated expenditure. Japan was also to nominate the chief engineer and head treasurer, while the entire management was to rest with the responsible general manager appointed by the Chinese Government. The exact figures are not yet available, but it is believed that the line cost about 4,000,000 *yen*. The Chinese Government has consequently contributed about 2,000,000 *yen*, or roughly one-half towards the cost of construction.

Kirin is the greatest lumber market in Manchuria. There are no other towns of importance on the route, but it is confidently expected that the trade developed with Kirin will justify the construction of the line. Kirin is situated in the middle of a great forest region—the northern spurs of the Chanpaishan—and is served by the Sungari River. A steamer service is maintained by the Chinese Eastern Railway; connecting with the railway at Taolaichao, which is about midway between Harbin and Changchun. The new line will prove one of the most important feeders of the South Manchuria Railway. The Russian line may benefit to some extent as the Russian station of Kuanchengtsu is very close to the Changchun station of the Kirin-Changchun Railway, but there is the disadvantage that the new line is of the standard gauge (as is the South Manchuria Railway) while on the Russian line the 5 feet gauge obtains.

The interlineal connecting service between the South Manchuria and Kirin-Changchun Railways, in the shape of a 2½ mile section between the S.M.R. Changchun Station and the K.-C.R. Toutaokou Station, was recently completed. As the case was with the connecting service between the Chinese Eastern and the S.M. Railways, the S.M. Railway undertook to construct that part of the connecting line which runs in its own Railway Area, the remainder extending from the boundary line of the Railway Area to Toutaokou Station having been built by the Kirin-Changchun Railway.

In the old days the journey from Changchun to Kirin took from three to four days, but now the journey can be done in six hours. The station at Kirin is some two miles distant from the east gate of the city, but a very good road has been made by the Board of Works under the supervision of a British engineer. This road passes through the International Settlement, which lies between the railway station and the east city wall.

It may be mentioned that the expenses in connection with the construction of the line were found to be greatly in excess of the original estimate. Mr. Fu was the first Chinese Director General appointed and was succeeded by Li Fen-nien and later by the present Director General Sun To-yui

The *Manchuria Daily News* says:—Opinions vary as to the actual value of this new railway as a carrier of goods.

The more optimistic observers seem to expect a great deal from the complete opening of the line.

One of them remarks as follows:

"At present two or three carloads of lumber are being sent out from Chiuchan Station 8½ miles west of Kirin. The export will become much brisker when the Sungari siding is finished, and is expected to increase to 10,000 tons, worth Y. 400,000, a year.

"Next to lumber comes tobacco leaves. They used to be carted all the way to Changchun, whence the Chinese dealers forwarded them to Mukden, and thence to China proper by the Peking-Mukden Line. The necessary decrease in the cost of transportation as a result of the completion of the new railway, will quicken the export of tobacco leaves and a conservative estimate puts it at 1,500 tons valued at Y.100,000 per season. A carload of tobacco leaves was despatched from Kirin by train on the 25th Oct. This is taken for the beginning of the coming brisk season which was opened in earnest about the 10th Nov., and will last till next March.

"Then come medicinal herbs which are mostly destined to Yingkou and are expected to amount to 550,000 *kin*. Hemp is exported to Mukden and Yingkou to the extent of 23,000 *kin*. Fungi are another important article of export, and find their way chiefly to Kaiping.

"The country lying to the east of Maanshan is a splendid cereal zone productive of beans, kaoliang, millet, &c. Kalunchich is expected to despatch 10,000 *koku* of Beans, Inmaho 20,000 *koku*, Hsiachiutai 10,000 *koku*, and Yingchengtzu 30,000 *koku*.

"Speaking of imports to Kirin, Cotton yarn and cloths constitute the most important items. About 80% of imports go from Yingkou.

The S.M.R. Co. Mining Department is opening an agency at Kirin to exploit a new market there for Fushun Coal."

ANTUNG-MUKDEN LINE

The line stretching between Antung and Mukden was a light railway, 2′ 6″ gauge, built originally by the Japanese Extraordinary Railway Corps during the Russo-Japanese War for a distance of 188 miles and 7 chains. Later, by virtue of the Sino-Japanese Agreement, Japan was authorized to alter it to the standard gauge of 4′ 8½″. The work was started in August, 1909, and the whole line was opened to traffic on November 1st, 1911.

The distance between the two cities, when reconstructed, was reduced by about 18 miles and 5 chains. In former days, goods were sent from Antung to Chiknan Shan twenty-one tons having been the maximum limit of the carrying capacity. At the latter place they were transshipped to 5 or 6 small freight cars and forwarded to Penhsihu, where they were transferred to larger goods cars and then sent to Mukden. In case of shipping goods from Mukden to Antung, the order was reversed. The trouble incurred was not the inconvenience to shippers, for several days were taken in transportation, to say nothing of the expenses that had to be incurred. Since through traffic was opened between the two points by means of the broad gauge the carrying capacity of the lines has been considerably increased, and the time taken for transportation has been reduced, whilst the expenses has been cut down to almost one half of the former rate. As it is, goods to be transported by this line are gradually increasing in quantity. Those articles imported to Mukden from Japan come by way of Dalny instead of utilizing the new railway, for reasons of freight and other matters.

Relations Between Important Korean Towns and Mukden

The principal articles imported to Mukden from Chosen are rice, skins, leather, bristle, hemp, cigarettes and salt fish. The importation of the articles has come to show a marked increase since the opening of the through traffic. For instance, Yalu lumber was being shipped formerly from Antung to Dalny and Yingkow by oversea routes and thence to Mukden, but now it is directly sent by the railway.

As to exports, a very few articles such as millet, kaoliang, cigarettes and cotton textiles were sent out from Mukden, but now Fushun and Penhsihu coals are being shipped to Korea by the Antung-Mukden Line. But Korea being an agricultural country like Manchuria, trade between the two regions is inclined to be limited to certain special goods. Be that as it may, as the result of the railway having increased its carrying capacity and reduced the cost of transportation the consumption of Penhsihu coal has been extended all along the line and it has give great facilities to the iron manufacturing business at Miaokou. On the other hand, a large quantity of fuel, charcoal *mufen* (material for joss-sticks) are now sent to Mukden from Chiaotou, Nanfen, Hsiamatang, Lienshankwan and Tsaohokou so that prices on these goods have been greatly reduced at Mukden.

Increase of Passengers

Travellers from Japan, who journeyed to Manchuria, proceeded by way of Dalny in former days, but now they cross the channel from Moji to Fusan, and then by taking the Chosen Railway go straight to Mukden. In the same way, passengers from Mukden take the same route. Since it is said that the number of passengers taking advantage of this line does not amount to one tenth of those journeying by the Dalny Line, however, traffic between the latter port and Japan seems to feel little difference on account of the opening of this line.

ARTICLES OF THE SZECHUAN HANKOW RAILWAY

After some negotiation between the representatives of the Szechuan provincials and the Ministry of Communications, the policy of government ownership of the Szechuan-Hankow Railway has been agreed upon, says the *Peking Daily News*. The terms, which have been regarded satisfactory and accepted by both parties concerned, are:—

(1) The Szechuan-Hankow railway shall be owned and managed by the Central Government.

(2) Whatever sum is left in the Szechuan-Hankow Railway Corporation shall be returned to the shareholders and be devoted to the development of industry in Szechuan.

(3) The Central Government shall be responsible for the payment of the labour cheques issued and the arrears to be paid to different concerns through which materials for construction were bought by the Corporation.

(4) The Ministry of Communications shall be responsible for the annual expenditure of the railway construction, for which expenditure the Ministry may issue shares bearing interest of six per cent. per annum.

THE TIENTSIN-PUKOW RAILWAY

The following is the report of the Japanese Commercial Commissioner on the effect of the Tientsin-Pukow Railway on the trade of North China:—

The Tsinpu Railway which is the connecting main line between Tientsin, N. China, and Pukow opposite Nanking is 628 miles in length, and is divided into two portions by the Grand Canal.

The Southern Section which is 233 miles in length extends from Pukow to Li Kuo which is situated on the Southern bank of the Grand Canal and was built by British engineers with capital found by British capitalists. The Northern Section which is 389 miles in length extends from Hanchang to Tientsin and was constructed with German capital and by German engineers, and the celebrated bridge across the Hwang Ho which was completed recently is such that trains will be running very shortly over it and when the express service is once inaugurated it is estimated that the journey from Pukow to Tientsin will occupy but 33 hours.

The most important stations on the Southern Section are Chuchou, Linhuikuan, Pengfou, Suchou and Hsuchou,

The goods which find their way into the Huai Ho Valley, and their way into the markets from the Huai Ho Valley, concentrate on the stations of Penfou and Linhuikuan and as the land to the north of this valley is not only level but very arable it is safe to say that there will be an expansion of agricultural products in the future.

The region in the vicinity of Hsuchou is mountainous and is very highly mineralised. The Grand Canal comes into Weishan Lake at Likuo and the Canal is crossed by the railway line between Likou and Hanchuang, but at the present time there is no market there and no connection between the waterborne and railway carried traffic.

Northern Section

The Northern Section of the railway on the other hand passes in the vicinity of many important towns and a branch line has been constructed from Lincheng to Tsaochuang, its principal duty being the carriage of coal.

The following large towns lie along the line of the Northern Section, Kunchou, Chufu, Tsinan and Lokou.

From the Southern portion of the Province of Shantung to the city of Tsinan-fu the country is very mountainous: from the North of the Hwang Ho to the city of Tientsin the country is generally flat but this part of the country is distinctly lacking in facilities for water transport and is unirrigated.

Economically speaking, the Railway can be subdivided into three spheres of influence, the first being the Nanking sphere, the second the Tsingtau sphere and the last the Tientsin one which starts at Techou, and it is noticeable for certain reasons that this last named sphere is not used to nearly the same advantage as the two first named.

Goods which are for transport by the railway are classified under three headings, i.e. first, second and third class goods.

The following are considered as first class goods:—

Metals and metal ware, provisions, (except second class goods, tobacco, oils, tools, porcelain, stationery, silks, imported cotton piece goods, woolen fabrics, clothing, toilet accessories, dyes, hides, leather, skins, plants, seeds, raw cotton, straw braids, drugs, candles, etc.

Second class goods are as follows:—

Wrought iron, nails, lumber, pottery, tiles, vegetables, bricks, fish, native cotton piece goods, cotton yarn, cereals, etc.

Third class goods are as follows:—

Granite, coal, lime, manure, animal bones, empty cases, gunnies, etc.

Freight rates are the same throughout the whole length of the Southern Section of the line and are for first class goods 5 cent per 1 ton per 1 mile, for second class goods, 3 cent per 1 ton per 1 mile, for third class goods, 1½ cents per 1 ton per 1 mile, and for dangerous or hazardous cargo, seven and one half cent per one ton per 1 mile, but if the picul rates are used they come to about one-tenth of a ton.

The Northern Portion of the line is divided into three sections which are from Tientsin to Sangyuang

from Sangyuang to Lokou
from Lokou to Hancheng

and the various freight rates on these sections are as follows:

	1st Sect.	2nd Sect.	3rd Sect.
1st Cl.	3 cents	3½ cents	5 cents.
2nd Cl.	1.6 cents	2.25 cents	3 cents.
3rd Cl.	1.2 cents	1.25 cents	1.5 cents.

For dangerous or hazardous goods 7.5 cents.

Owing to the great competition with water traffic that the first section has to meet there has been a substantial decrease in freight rates.

Freight Rebates

It is not known what rebates in freight are given on the Northern Section but large shippers are given rebates in the Southern Section.

For first and third class goods if shipped in quantities requiring the use of a 20 or 30 ton car exclusively 15 per cent. rebate is granted, and 33 per cent. discount is given on foodstuffs, cereals and beans. For salt there is a discount of 25 per cent. and for all other second class goods 10 per cent.

The Southern section has an arrangement with the forwarding agencies whereby shippers of $28,000 of freight will receive at the end of a year a rebate of 7 per cent., shippers of $48,000 a rebate of 10 per cent., and shippers of $90,000 a rebate of 13 per cent., for which they are expected to provide and own godown accommodation of the value of $20,000 at least, but if they have accommodation of a less value than this their rebates will be reduced to 5 per cent., 7 per cent. and 10 per cent. for similar amounts of business.

Likin stations as administered under the old system are still in existence along the line, but at Pukow, the southern terminus, there is no likin office and goods which are actually transported by the railway company at the present time from Pukow to Tientsin are in the very favourable position of not having to pay any inland taxes whereas the goods that follow the same route overland have to pay at the various barriers the likin tax.

The goods which are exported from Eastern Honan, Northern Anhuei and Northern Kiangsu which go to the southwards by the Huai Ho Canal still have to pay the heavy likin so that they are now sent to Pukow by rail from Penfou and Sinhui-Kuan.

With regard to goods exported or imported in the Shantung province along the railway line the likin barriers exist only in Luankou and the districts along the Yui Ho Canal and goods entering the province through Tsingtau are not required to pay the half duty that is customary in other treaty ports and as the extensions of the Tsinpu Railway are made so will the trade between Tsingtau and the interior of Shantung prosper.

In the district between Tientsin and Taokouchen in Honan which is served by the Yui Ho Canal there are a large number of Likin stations in the following places:—

Tientsin, Yangliuching, Tuliu, Techou, Linching, Lungwangmiao, Chuwang and Taokouchen.

The goods from these districts are subject to heavy taxation before they are sent to the railway and the only places where goods can be brought to the railway free of taxation are Tsaiyuan and Techou.

At the time of writing, the Railway authorities having investigated this matter, and negotiations are proceeding with the Central Government with a view to having these taxes considerably reduced if not abolished, so as to give the Railway a fair chance.

Effect of Railway on Chinkiang

The Chinkiang trade sphere may be said to include the whole district North of Yangtse River. Formerly the trade of the valley of the Grand Canal to the southward of Tsining, in Shantung, and the trade of Northern Anhuei and Eastern Honan where the main stream and tributaries of the Huai Ho passed through and served, concentrated on Chinkiang.

Since the building of the Tsinpu line and its advantages to trade, the produce of the district about Soochou in North Kiangsu, and the country round Liuhuikuan will inevitably use the line, and the junks that have been in the habit of using the upper reaches of the Huai Ho in the past will all concentrate on Linhuikuan and Pengfou.

The goods that are under transit pass, and thus exempt from inland taxation, about which time is not the great and important consideration, will, as before be carried by water and will be transported to Chinkiang, but the goods which are subject to taxation from Northern Anhuei and other places before mentioned, will be concentrated at Nanking and Pukow for railway transport.

The natural result of increased prosperity in the carrying of railway goods will probably decrease the junk traffic very much and will decrease the number of junks calling at Liuhuikuan although at the present time most of the goods that are carried under transit passes and are thus exempt from inland tax are still carried by junk, and the decrease in junks will mean the increase in freight rates by the junk owners which will cause even more cargo to be driven into the ever open arms of the enterprising railway officials.

Owing to the fact that most of the transactions in both Chinkiang and Shanghai in export cargo are for hard cash, rapidity of transport is of more importance than rates of freight and

this also is causing an increase in the carrying trade of the railway.

The principal classes of goods that will be affected in consequence of the reasons we have explained are, cotton piece goods, silks and miscellaneous goods. As has been explained above, it will be easily seen that the imposition of likin and the tightness of the money market are two causes which specially affect the trade to the north of Chinkiang, but this tightness in the market will gradually disappear as order is restored in the interior.

The future prosperity of Chinkiang will to a large extent depend upon the gradual abolition of the Likin barriers altogether but no matter what the future of Chinkiang may be, the future of Pukow and of Nanking, Hsiakuan is bound to be good through the opening of the Railway.

Lately the Shanghai Nanking Railway authorities have suggested to the produce people to ship their produce by the Tsinpu Railway to Pukow and thence by the Shanghai-Nanking Line to Woosung, because beans and sesamum seed sent by this method of transport will come to Shanghai in two weeks earlier than it sent via Hankow or by junks as has been done in the past.

Of course if the produce shippers adopt this suggestion it will have a very bad effect on the trade of Chinkiang.

The trade of Chinkiang of late is only about 30 per cent. of what it was a while ago, but this is due chiefly to the danger of shipping goods owing to the internal disorders which have beset China in the past year or so, and to the tightness of the money market, and it may be said that of the total diminution in Chinkiang's trade about 30 per cent. of it was due to the opening of the railway, this being accounted for by the fact that the railway has chiefly been used for native goods, imports such as sugar, matches, cotton yarn, and cotton piece goods being sent through Chinkiang as before.

The reason for this is that the junk people on their trips into the interior sell to the people through whose country they pass, acting as sale men for the importers in fact, and in addition to this the freight by railway on these classes of goods is very high.

Effect on Tsingtao

Owing to the facilities in the matter of duty, etc., it is very convenient for shippers of import and export cargo from the districts with Tsinan-fu as a centre to have their goods passed through Tsingtao, for there is but one likin station along the line of rail and that is situated at Kiaochao, whereas there are frequent likin stations in the valleys of the Canal, Huang Ho, Hsiaoching Ho and Yui Ho. Moreover necessity for transit passes in this rail borne cargo is done away with.

This very satisfactory state of affairs has materially assisted the development of the interior of the Province of Shantung and the progress that has been made especially in agricultural products since the opening of the line has been nothing short of marvellous.

Owing to the goods having to pay half duty and the existence of likin stations in the district of Tientsin, a great deal of the trade that used to be done in import and export cargo destined for the Tsinan sphere through Tientsin is now being diverted to Tsingtao.

The native products of Tsiningchou and Yenchou-fu were formerly collected and sent to the South through Tsinning the terminus of the South Canal but the fact that there is no likin as well as the convenience of the railway traffic from the interior of Shantung, will firmly establish the influence of Tsingtao in this section of Shantung. The same phenomenon will be noticed to the Northward of the Huang Ho. Also, in western Shantung, the part which was formerly served by Tientsin, the Chinese produce seller, who is very careful in his calculations, will reckon out the costs of transporting his goods by the old and the new ways and will of course adopt the cheapest method, and as there are ever increasing quantities or Lintsing cotton finding their way out by Tsingtao via Tsinan-fu, this is good evidence for assuming that the sending by Tsingtao by the railway will rapidly increase.

By the linking up of Tsingtao to the Tsinpu Railway system there has been already an expansion in trade in the following important centres, at part of Yenchou-fu, Taian-fu, Tungchang-fu, a part of Lintsingchou and the northern part of Hang Ho, and further expansion is surely expected.

Although the freight rates between Lukow and Hanchuang on the Southern frontier of Shantung are as high as those obtaining on the Southern section of the Tsinpu line, there is reason for this, there being no competition between the railway and river so that the produce from this part of the country will all find its way to the railway for carriage to Tsingtao via Tsinan-fu.

Effect on Tientsin

Seeing that the Yu Ho runs close along the line traversed by the Tsinpu railway from Tientsin to Sangyuang which is near to Techow on the borders on the Chihli Province, the rates of freight on this particular section of the line are the cheapest in the whole system, and between Techow and Huang Ho there are no very big trade centres, so traffic in that section is not so very large.

In the valley of the Yu Ho, Lintsing is the largest trade centre and it is connected with Tao Yu Chen in Honan, and the districts in the Yu Ho Valley which are most convenient for shippers of goods by rail lie between Tehchow and Tientsin, and the districts between Tientsin, Tehchow, and Lintsing, do not enjoy the advantages of the Railway traffic as in the districts between Chuchon, Linhuikuan and Nanking in the Southern section of the line.

The time taken by junk to transport goods between Lintsing and Tientsin is about one week in average circumstances, and in going from Tientsin to Lintsing there is about a 20 per cent. increase in the rate of freight in addition to which the journey takes from fifteen to twenty days according to the state of the river.

The Railway freight rate for second class goods between Tientsin and Sangyuang is 21 cents per picul, and the railway freight rate on second class goods between Tientsin and Tehchow is rather more then 24 cents per picul, so that comparison shows that goods which have to be brought from Lintsing to Tehchow by water and then transferred to the railway for shipment to Tientsin will cost a substantial deal more than waterborne cargo, hence shippers do not avail themselves of the Railway in these parts unless it is a case that the particular cargo is such that quick transport of the same is a necessity.

From the viewpoint of general commodities, Tientsin will not really suffer any appreciable commercial loss through the opening of the Tsinpu Line, nor will Tientsin receive any particular advantage, as also Tientsin need not fear that improved railway communication will cause Tsingtao to rob her of a fair share of interior trade, as the freight rates of the railway are so high in these parts compared with that of the water routes to Tientsin will be continued to be used extensively except for such special goods as it is necessary to be shipped rapidly to Tsingtao.

Tsingtao, it is admitted, stands in a much more favourable position than Tientsin, owing to the absence of Likin stations and the resulting payments of half duty but if the Government for the sake of finance, finds it necessary to institute Likin stations in Shantung then the Tsinpu railway will be more utilized for carrying goods to Tientsin. The Railway cannot hope to beat the water traffic, but, if the above described taxes are imposed, the railway will receive much more carrying to do from districts in which there is no water communication.

Future of Tsinpu Railway

The above remarks convey in a rough sort of way the conditions of the line at the present time.

Taking first the Southern section, the future of that is assured. Pengfou and Linhucikuan are rapidly assuming much importance as trade centres owing to the water and rail communications meeting there, and around Hsuchow, as soon as normal conditions are restored, which do not exist at the present time for a variety of reasons, there will be tremendous trade increases in these districts.

As regards the Northern section, owing to the fact that Tsinan-fu is the direct junction of the Tsinpu and Tsingtao lines it will become more and more the actual trade centre of Shantung.

It is not so very long ago that Tsinan-fu was opened to international trade consequently there are as yet in Tsinan but few foreign firms that deal in native produce established, but of course that must now alter owing to the exceptional railway facilities and we prophecy that in the next few years there will be a very remarkable expansion of trade so that the outlook from that as regards the earnings in the future of the railway are very promising.

With reference to the Hsiao Ching River which runs between the city of Tsinan and the Gulf of Pechili at a place called, Yuan Chao Kao, the river is too shallow to be of much use at the present time; and it is 400 li in length. If however it were dredged, much use could be made of it and it would serve a number of places and would directly benefit the line. As it is this river is now only used for the conveyance of salt.

Revision or abolition of the present inland taxes would give much relief to water borne traffic in the districts north of the Huei Ho but there would be no corresponding benefits to the railway, still, whatever may be done in future, goods destined to be shipped across the seas to foreign countries will as time goes on more and more use the railway which has entered upon a career of, we trust, great prosperity.—*The China Tribune.*

SOUTH MANCHURIA RAILWAY

Locomotives and Rolling Stock

The latest returns for the locomotives and rolling stock of the S. M. Railway are as follow:—

Locomotives:

Inspection locomotives	2
Double ender tank engines	69
American type	4
Prairie Switcher type	35
Ten wheeler type tender	30
Pacific type tender	7
Consolidation type tender	108
	255

Cars and Wagons:

State car	1
1st cl. passenger cars	5
1st and 2nd cl. composite cars	24
1st cl. and Baggage composite cars	7
1st cl. and Dining " "	3
Dining cars	3
Sleeping cars	0
2nd cl. passenger cars	36
3rd " "	50
3rd cl. and Baggage composite cars	30
Mail and Baggage composite cars	22
Inspection car	1
Box cars	1,211
Gondola cars	1,099
Coal cars	165
Flat cars	123
Water tank cars	5
Oil tank cars	6
Caboose cars	106
	2,715

Principal Bridges

On Main Line:

	Length.
Over Hsingyocheng River	1,352 ft.
" Taitzu "	1,467 "
" Hun "	2,606 "
" Tiehling "	1,014 "
" Ching "	2,262 "
" Tungliao "	1,014 "

On Mukden-Antung line:

Over Taitzu River	1,785 ft.

Principal Tunnels

	Length.
Fuchinling Tunnel	4,884 ft
Chikuanshan Tunnel	3,254 "

Traffic Returns

The S.M.R. Traffic Returns for the month of October give Y. 1,259,743, being a decrease by Y. 14,360, as compared with the corresponding period of last year. The daily average amounted to Y. 40,637.

The aggregate receipts from last April totalled Y. 8,219,051 which means an increase of Y. 621,724 on the preceding year.

Capital Expenditure

The South Manchurian Railway Company management invested the total sum of Y.117,050,000 as capital expenditure up to March 1912. Originally, says the *Manchuria Daily News*, the sum of Y 100,000,000 was set aside for capital expenditure, but this was thought inadequate for the purpose, and the total was increased three years ago by Y.40,000,000, so as to meet the requirements of the first stage of the company's programme of sundry enterprises. The plans for the first stage were closed at the end of last March, and as the capital outlay for the second stage, a sum of Y.47,380,000 has been appropriated for disbursements during three years dating from the present fiscal year. This sum will be employed mostly in the construction and improvements of the railways, harbours, etc. The share allotted for the present year is Y. 15,920,000. This will be principally supplied by the Y.10,000,000 which was called up in two instalments of Y.6,000,000 and Y.4,000,000 on June 1st and Oct. 1st respectively. As regards the Y.31,460,000 for disbursement during the two succeeding fiscal years, the remainder of the subscribed share capital of the company, amounting to Y.8,000,000, will be called up first of all, and the balance of Y.23,460,000 is most likely to be raised by offering share stocks of the company for subscription, which is invested with the authority to increase its share capital up to Y 100,000,000 as occasion may require. It is said that no debentures for the purpose of raising the above-mentioned balance will be floated abroad.

KOWLOON-CANTON RAILWAY

At the meeting of the Hongkong Legislative Council held on October 26, the Colonial Secretary gave some interesting information relative to the Kowloon-Canton Railway. He stated that the total sum now estimated as being required to complete the construction and equipment of the Main and Branch Lines amounts to $2,128,052, or, excluding the sum of $1,473,880 already voted by Council for the Station site, to $654,172. The principal items of which this last figure is composed fall under five main heads of expenditure, namely, (*i*) Station and Station Yard, (*ii*) Locomotives, (*iii*) Addition to Engine and Engine Shops (*iv*) Carriage and Wagon Rolling Stock, and (*v*) Manager's House.

Station and Station Yard

The provision required on this account is distributed under the following heads of charge:—

Formation	
(c.)—Roads	$ 6,655
Track	
(a.)—Ballast	10,954
(b.)—Permanent Way	31,075
Station and Buildings	
(a.)—Buildings and Fixtures	254,128
(b.)—Station Machinery	18,081
(c.)—Furniture	6,000
General Charges	
(a.)—(1.) Salaries and Allowances	12,477
(2.) Office Expenses	1,002
	$341,272

With the addition of one more main line engine there would be five engines of this description and three branch line engines, the order for the third branch line engine being now in the hands of the Crown Agents.

In regard to the terminal station at Kowloon the Colonial Secretary said that the plans for that building were not thrown open to public competition among local architects and others. He found that he could make more economical arrangements which he thought would be quite satisfactory. Mr. Hubback, of the Federated Malay States service, was to undertake the work, no matter what the cost might prove to be, whether $200,000 or $300,000, for an inclusive fee of $5,000, which, he thought was exclusive of travelling expenses to this Colony and hotel expenses. Mr. Hubback was a gentleman who had designed many terminal stations for large railways.

Great dissatisfaction is felt by the architects and civil engineers in Hongkong at the arrangement. It is pointed out that the recognised professional scale of remuneration for Architects services in the Federated Malay States is 7% on the cost of a building and in Hongkong for a building of this description would be 5% plus 1½% for quantities, so that assuming the Building to cost $200,000 the Government proposed to get for $5,000 what according to the recognized professional scale they should pay $13,000. The Royal Institute of British Architects of which body Mr. A. D. Bubback is a Fellow might have something to say in the matter, and it is suggested that it is more than probable that Mr. Hubback himself, will, when he learns of the invidious position in which he has been placed, decline to have anything further to do with what is described by one critic as a "Jew's Bargain."

SHANGHAI TRAMWAY RETURNS

The returns of the Shanghai Tramways (Foreign Settlement) for the week ended November 6 are as under:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	16,717.79	14,930.32
Passengers carried	859,313	700,896
Car miles run	52,702	50,799

The loss by exchange of subsidiary coinage for the week was equal to 23.57 per cent. of the gross cash collected on the cars as compared with 22.37 per cent. for the corresponding week last year.

For the week ended November 13:—

	1912.	1911
Effective receipts (after deducting loss by exchange)	$15,457.98	$14,186.97
Passengers carried	784,669	680,229
Car miles run	51,127	50,008

The loss by exchange of subsidiary coinage for the week was equal to 23.39 per cent. of the gross cash collected on the cars as compared with 23.19 per cent. for the corresponding week last year.

For the week ended November 20:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	$16,174.51	$13,164.38
Passengers carried	823,813	629,571
Car miles run	53,544	48,395

The loss by exchange of subsidiary coinage for the week was equal to 23.29 per cent. of the gross cash collected on the cars as compared with 23.44 per cent. for the corresponding week last year.

The returns for ten months ended October 31 are as under:—

Effective receipts (after deducting loss by exchange)	$662,036,40	$514,209,49
Passengers carried	33,872,338	21,379,520
Car miles run	2,295,535	1,807,327

The loss by exchange of subsidiary coinage for the period was $201,940,61 equal to 24.86 per cent. of the gross cash collected on the cars, as compared with $134,110.79 equal to 22.72 per cent. for the corresponding period last year.

SHANGHAI-NANKING RAILWAY RETURNS

The following figures of traffic returns (approximately) for the week ended November 2, are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	40,521	9,747	50,278
1911	67,700	7,829	75.538
Increase .	—	1,918	—
Decrease.	27,178	—	25,260

For forty-four Weeks.

Year.	Passengers.	Goods and Sundries	Total.
	$	$	$
1912	1,897.429	340,713	2,238,142
1911	1,532,652	258,815	1,791,467
Increase	364,777	81,898	446,675

For the week ended November 9:

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	35,232	7,638	42,870
1911	61,607	7,086	68,693
Increase .	—	552	—
Decrease.	26,375	—	25,823

For forty-five Weeks.

Year.	Passengers.	Goods and Sundries	Total.
	$	$	$
1912	1,932,661	348,351	2,281,012
1911	1,594,259	265,901	1,860,160
Increase .	338,402	82,450	420,852
Decrease.	—	—	—

For the week ended November 16:

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	43,042	10,108	53.150
1911	46,006	7,087	53,093
Increase .	—	3,021	57
Decrease.	2,964	—	—

For forty-six Weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912	1,975,703	358,459	2,334,162
1911	1,640.265	272,988	1,913,253
Increase	335,438	85,461	420,909
Decrease.	—	—	—

A telegram, addressed by the Chinese Chambers of Commerce of Shanghai and Chinkiang to the Ministry of Communications at Peking, and republished in the Chinese Press, reads:—

As requested by the firms and merchants of Chinkiang interested in the business of transporting cargoes, who jointly submit that, owing to the inadequate provision of freight cars both on the Shanghai-Nanking and the Tientsin-Pukou Railways, much delay has been caused in the transport of cargo, which has a detrimental effect both upon commerce and upon the development of railway traffic. They assert that the Tientsin-Pukou Railway has consented to increase, somewhat, the accommodation for cargo, but the Shanghai-Nanking Railway has not yet vouchsafed any definite arrangement. They therefore earnestly pray that a telegraphic request be addressed to you for an order to be issued to all the stations to add more freight cars without delay, etc. We beg to ask your Ministry speedily to order the stations, etc.

ELECTRIC RAILWAY IN JAPAN

Mr. S. Furukawa, Director of the Central Office of the Japanese Imperial Government Railways, recently stated to a *Japan Advertiser* reporter that the scheme to put down an electric railway between Tokyo and Yokohama contemplates the substitution of electricity for steam not only from Tokyo to Yokohama, but from the latter point clear through to Kamakura, the present traffic being limited to the Tokaido, but that at the outset Yokohama would be the terminus of the electric road.

The new electric double-track from Gofukubashi, Tokyo, to Takashima-cho, Yokohama, will be reserved wholly for passenger traffic, and an entirely distinct steam line for goods is being built skirting the coast to the left of the electric route from Tokyo direction as far as Kamakura. The existing steam line will pass Kanagawa and thence proceed to Hiranuma and beyond, the line to Yokohama being abolished. For the new electric route the lines have already been laid from Shimbashi to Tsurumi.

The single overhead trolley system is being adopted, and the power-house is now under construction at Kawasaki. As far as is now known, each train will be made up of three bogie coaches, first, second, and third class, and will provide seating accommodation for more than two hundred persons.

An approximate estimate of the total cost of the new electric line, tracks, buildings, and rolling stock inclusive, is eleven million yen.

Korean Railways.—The Chosen Railway coaches which have been fitted with the Stone system of electric lighting were placed in service in October. The lighting is carried out by means of a dynamo and battery of accumulators suspended from the underframe of each coach. The equipments have been supplied by Messrs. J. Stone and Co. Ltd., Deptford, London. When the train is running, the dynamo supplies the current to the lamps and fans. When the train stops, the dynamo is automatically disconnected and the current is supplied by the battery.

In the sleeping cars, by means of an ingenious arrangement of switches, a bright light is obtained until the passenger wishes to retire, when he can either switch the lamps entirely or can turn them down so as to burn dimly during the night time.

The initial trials having proved successful, the Railway authorities have decided to equip the whole of the coaches, including third class, with electric light before the end to the present year.

Mr. Powell, the popular representative of Messrs. J. Stone & Co., is to be congratulated on the successful installation.

Szechuan-Hankow Railway.—General Li Yuan-hung, of Wuchang, has given an order to the effect that the accounts of the Szechuan-Hankow Railway be squared so that the work may begin soon. It is reported that Mr. Linow, the German Chief Engineer of the Tientsin-Pukow line, has been appointed by the Chinese Government as superintending Engineer for the German part of the Hankow-Szechuan line (Hankow-Ichang.)

At a conference held by General Li, Civil Governor Liu of Hupeh and the managers of railway affairs it was decided that the Szechuan-Hankow and Canton-Hankow Railways should be nationalized. It was arranged that all the material for the construction of the railway purchased by the private capitalists should be redeemed by the Government. The funds now reserved by the "people's Railway Company" may be invested in other commercial enterprises. The Company is authorized to construct the tributary lines in connection with the trunk railway.

The Peking Tramways.—The construction of the tramways in Peking, it was recently reported, had been placed in the hands of Mr. Chen Hsien-chu, who was said to have made full plans to raise a capital of $3,000,000. Mr. Chen was reported to have already obtained $1,000,000 which it was said would soon be remitted from Shanghai. As soon as the rules and regulations have been passed, the remaining $2,000,000 was to be raised in the provinces. It has been decided to have two main lines outside and inside the city, and also to have a number of branch lines to Hsichihmen and other important point. Latest reports, however, state that there has been a hitch in the financial arrangements, and it is reported that the contract is likely, after all, to go to a German firm.

The Hukuang Line.—According to a telegram from Changsha, under date of November 18, work on the Hunan section on the trunk line from Canton to Hankow has been resumed. It was interrupted by the revolution and the later negotiations for a change of the original agreement to fit in with the new conditions. Mr. Collinson, the engineer-in-chief, and his party, are said to be at work on the northern end and on the Hupeh border, whilst at Chenchow, in the south of the province, Mr. Dees and his party are surveying.

Russian Endeavors.—News from Peking is to the effect that Russia has sent a demand to the Peking Government that the franchise for the construction of a railway between Moscow and Peking be given to Russians, but the Government has declined to grant this request.

A Harbin newspaper states that the Russo-Mongolian protocol provides for the construction of a railway from Kiakhta to Urga.

Some Russians have been granted by the Mongolian authorities at Hailar the desired franchise for the opening of a motor car service between Manchouli, Kulun, and Hailar.

Penang Hill Line.—At a recent meeting of the Penang Legislative Council it was decided to vote $100,000 for the construction of a railway to the summit of the hill—a scheme for which the Governor hoped would be evolved before the end of the year.

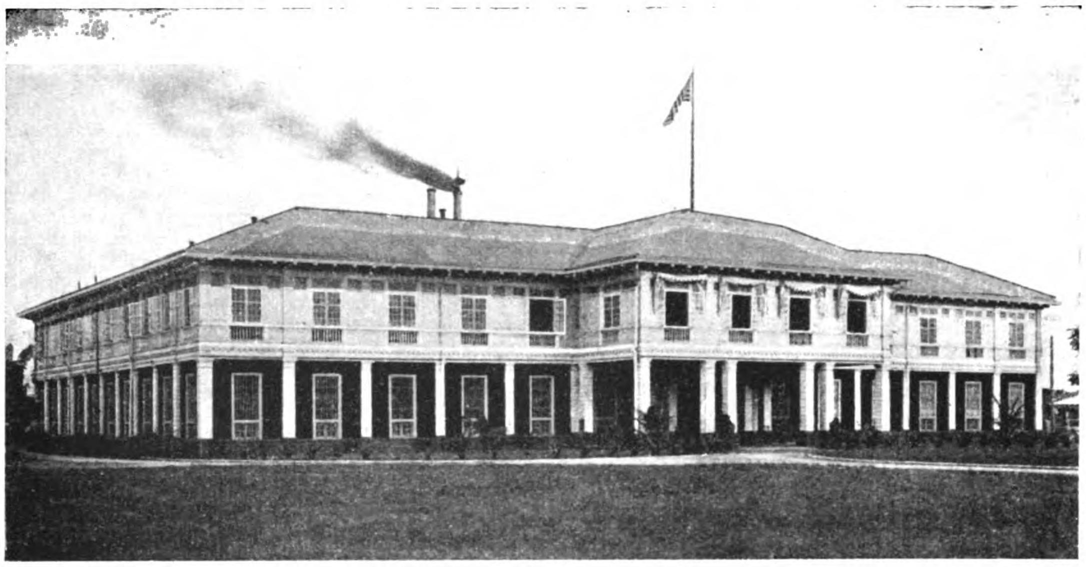
Tientsin-Pukow Line.—The opening ceremony of the Tientsin-Pukow line is to take place on December 1. There will be a function at Pukow and Tientsin, the latter being the most important. The Yellow River Bridge (which was fully described in the October number of the FAR EASTERN REVIEW), was handed over to the Chinese authorities on November 16.

Light-rail Service at Kaiyuan.—The desired permission for the extension of the existing light-rail service at the Railway Town of Kaiyuan to the other parts of the town was given to the applicant, Mr. K. Kondo, Manager of the Sung Mow & Co., Tiehling, on Sept. 29. The work of extension will be commenced shortly.

Yellow River Bridge.—The last bolt of the Yellow River bridge on the Tientsin-Pukou Railway was riveted on November 16 in the presence of the Governor of Shantung and the chief engineers of the German and British sections of the railway, M. Borkowitz, engineer of the bridge, and large crowds of foreigners and Chinese. Regular through traffic will begin on December 1, when the Minister of Posts and Communications will open the line.

PHILIPPINE GOVERNMENT PRINTING OFFICE

Less than a decade ago, upon the recommendation of President Taft, then Civil Governor of the Philippines, and Brig. Gen. Clarence R. Edwards, chief of the Bureau of Insular Affairs, the War Department decided to establish a government printing office in the Philippines, and Mr. John S. Leech, of Illinois, was selected as the public printer. He was instructed to prepare specifications for the equipment of a printing establishment of sufficient capacity to handle the work of the newly established government and to teach natives all branches of the printing trades. Few American printers are aware of the fact that, as a result of the manner in which these duties were fulfilled, there is in operation to-day on the borders of Asia—the "mysterious continent" that has ever frowned on progress—one of the most modern and complete printing plants in existence.



BUREAU OF PRINTING, MANILA

The Bureau of Printing was established in Manila in 1901. At that time the Filipino had no knowledge of the linotype, modern printing machinery, photo-engraving, electrotyping, or letterpress embossing. Only the crudest efforts at letterpress printing were in evidence before American occupation of the Philippines. During the three hundred years of Spanish rule practically no effort was made to improve the quality of the product and the intellectual capacity of the producer was equally backward. Among the more than twenty distinct dialectal divisions, composing a heterogeneous population of 8,000,000 people, technical knowledge of printing was confined to a few Spaniards and a sprinkling of Tagalos in the city of Manila.

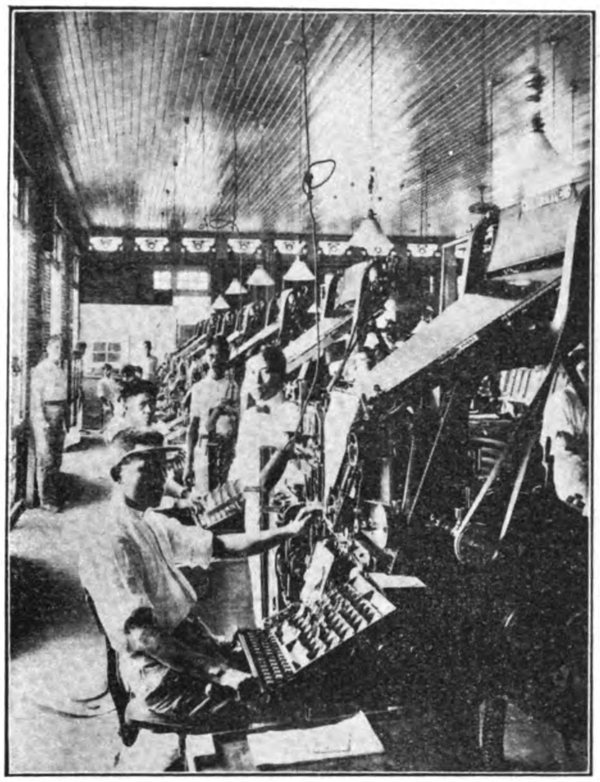
When the edict, "Teach the natives the printing trades," went forth, the magnitude of the undertaking seemed startling to those best acquainted with the conditions under which the instruction would necessarily be imparted. A consensus of opinion, if secured from those who were the first instructors, would have stifled the attempt. There was a Babel of languages—no common medium of communication—the dialects of the Philippines being as foreign to each other as Greek to Sanskrit. In some cases the inhabitants of adjoining towns where the same dialect is in use have difficulty in understanding each other because the people are so circumscribed in their local affairs and civilities. The apprentice from the Visayas could not converse with his Ilocano co-worker; the Pampango could not understand the Tagalo. Such was the condition existing among all of the representatives of the different peoples— Pangasinan, Bicol, Zambales, Cagayan, etc. But the projectors planned not for defeat. Their work was begun in the spirit of faith and continued in hope; the ground had to be tilled and made ready for the intellectual sowing. The expected difficulties were met and overcome by diligence, patience and concentration of purpose. Apprentices were required to attend English night schools, their technical instruction in the bureau was of an order that appealed to the intellect to grasp and not to the eye to copy, with the result that at this time every mechanical operation in the Bureau of Printing is performed by native Filipinos under the supervision of American craftsmen instructors. All of the Christian peoples and the remotest provinces of the islands are represented in the bureau. English is the language substituted for the many dialects and the native is acquiring an education as well as a useful trade. Eight trades are taught, and there are eighty or more apprentices under instruction in the various divisions at all times.

MR. JOHN S. LEECH

The Bureau of Printing apprenticeship school is a model for a manufacturing institution. The apprentices are classified in order that no injustice may be done the apt and enthusiastic, the advantages being two-fold—giving a mark of distinction to the efficient and increasing the efforts of the backward. It may surprise those who are familiar with the Malay character to learn that this does not result in self-elation in the one or in the humiliation of the other.

Efficiency records are kept and discipline is maintained by a system of commendatory and adverse reports, which result in letters of appreciation for meritorious work and written reprimands in cases of carelessness, insubordination or infractions of office rules.

Director Leech's method of instruction, owing to the peculiar conditions existing in his field of work, is necessarily a departure from the modern tendency to make every man a specialist and confine him to operations of one class. His system comprehends thorough instruction in each operation of the several branches of the printing trades. The apprentice is not forced to acquire mechanical skill by chance contact with the daily routine of the journeyman, but is under the constant supervision of efficient American instructors. The training of young men in the Bureau of Printing is systematic, being co-ordinate with that of the public school system and, as an



COMPOSING ROOM—LINOTYPE SECTION

ELECTROTYPE AND STEREOTYPE DIVISION—FINISHING SECTION

PHOTO-ENGRAVING DIVISION—CAMERA SECTION

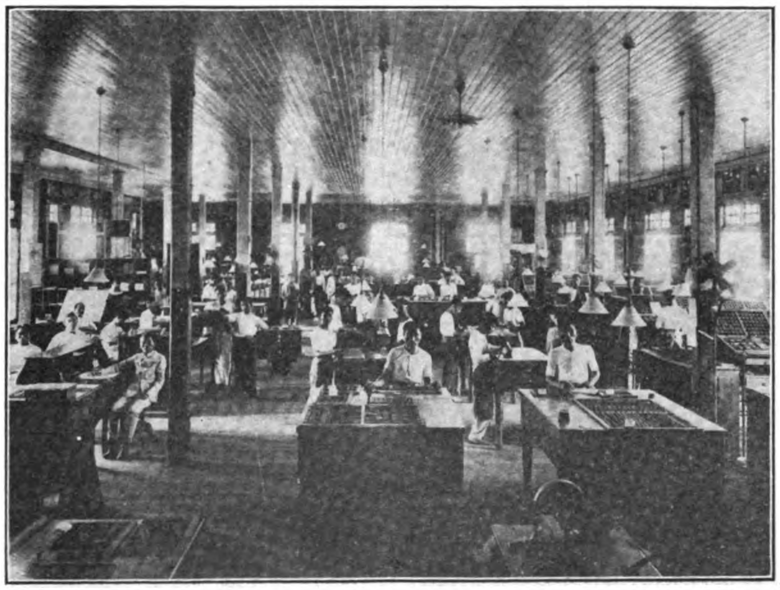
industrial school, is among the few that turn out finished journeymen.

The apprentice is assigned to a branch of the printing trade according to his adaptability for the work, careful consideration being given to his physical and mental qualifications. There are six class periods of six months each, and if he qualifies in all the apprentice is promoted to junior craftsman at the end of three years. The work of a junior craftsman covers a period of one year and includes advanced specialties and a review of the work of his apprenticeship. Therefore, if he has shown proficiency in all of his work, the employee is graduated as a craftsman at the close of his fourth year.

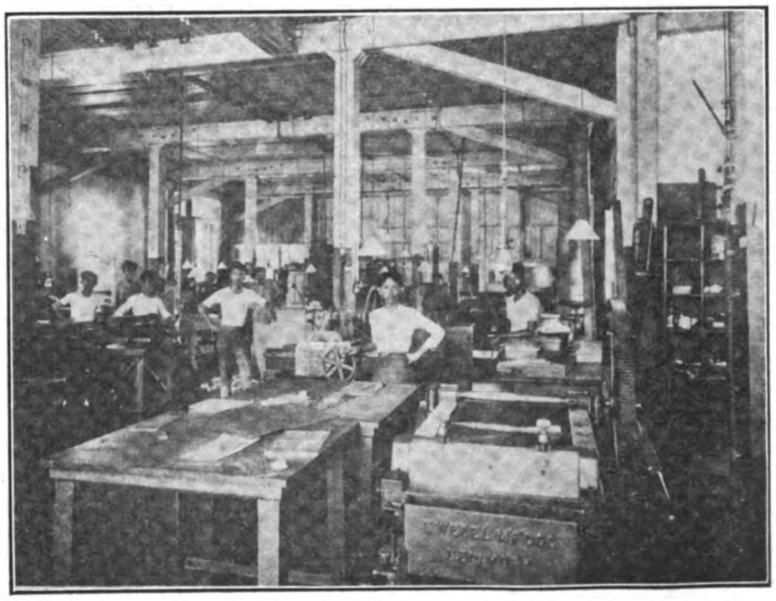
The simplest work is taught first. An apprentice who demonstrates inaptitude for mechanical details during the first-class period of six months is advised to seek other fields of labor. Justice to the employee as well as to the service demands frankness in a matter that influences the formative period of a boy's life. Should the apprentice prove to be dull and his progress not in keeping with the character of the work, he is retained in the current class period a sufficient length of time to complete the necessary specialties. Apprentices are rated every six months and none is promoted until proficiency is shown in all work. This thorough instruction finally results in a craftsman who is competent to perform any task assigned to him—one who is a credit to his trade.

The Bureau of Printing is situated along the Paseo de Bagumbayan, adjoining the botanical gardens. The grounds are adorned with cocoanut palms, shell walks and winding drives. The interior of the building, with its hand-carved stairways of red hardwood, its polished floors and its modern office paraphernalia, is a model of neatness and cleanliness. The mechanical divisions are logically arranged in the most advantageous manner for the progress of the work. Every year hundreds of people visit the plant and are surprised at the scope of its work and the dispatch with which it is accomplished. This is particularly true of the round-the-world tourist, who, ere he reaches Manila, has become imbued with the belief that it were idle to attempt to "hustle the East."

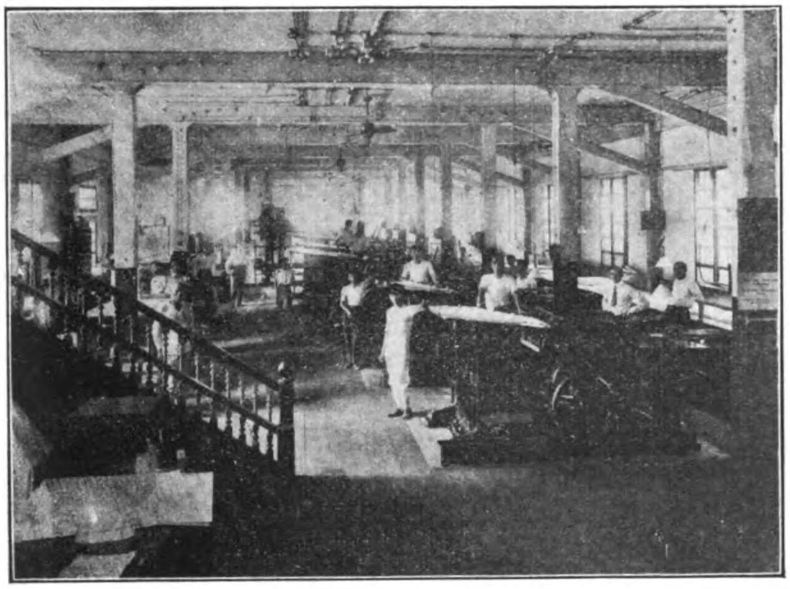
A day's work in the Bureau consists of seven hours, with a half holiday on Saturday. The American instructors receive twenty-eight days' vacation leave annually. In addition they receive thirty-five days' leave annually which may accrue for a period of five years. Employees are required to work at least two years to obtain the benefits of accrued leave and reimbursement for traveling expenses incurred in coming to Manila. The privilege of taking accrued leave for the purpose of visiting the United States or foreign countries, with reimbursement for return traveling expenses, is granted every three years. No leave is granted the native workmen, but in lieu thereof they receive an annual bonus, the amount of which is governed by their attendance and the nature of their services. The bonus is the director's solution of the difficulty that confronts nearly every employer



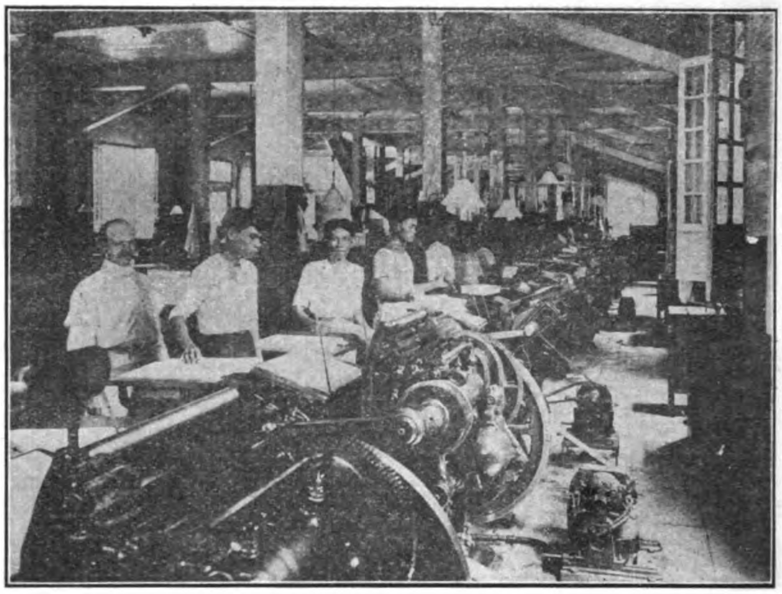
COMPOSING ROOM—DOCUMENT SECTION



ELECTROTYPE AND STEREOTYPE DIVISION—MOLDING AND CASTING SECTION



PRESS ROOM—CYLINDER PRESS SECTION



PRESS ROOM—PLATEN PRESS SECTION

BINDERY DIVISION—FINISHING, SEWING AND NUMBERING SECTION

BINDERY DIVISION—RULING SECTION

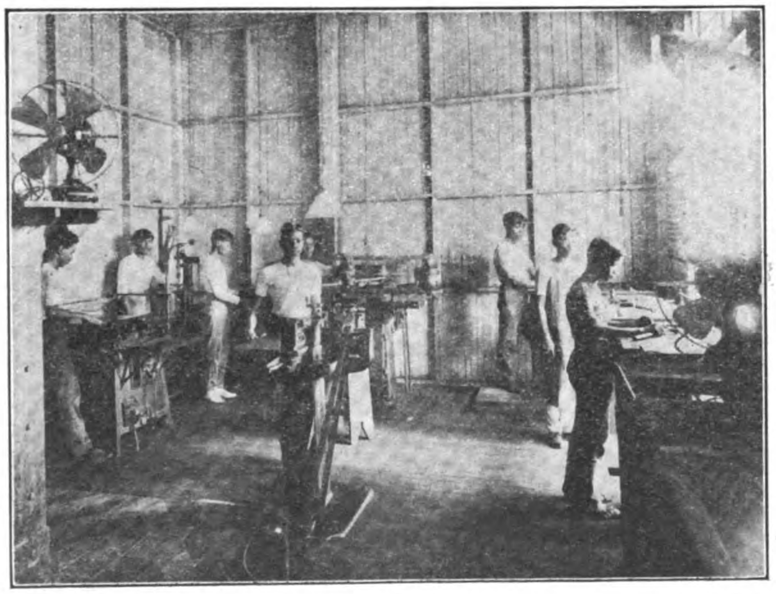
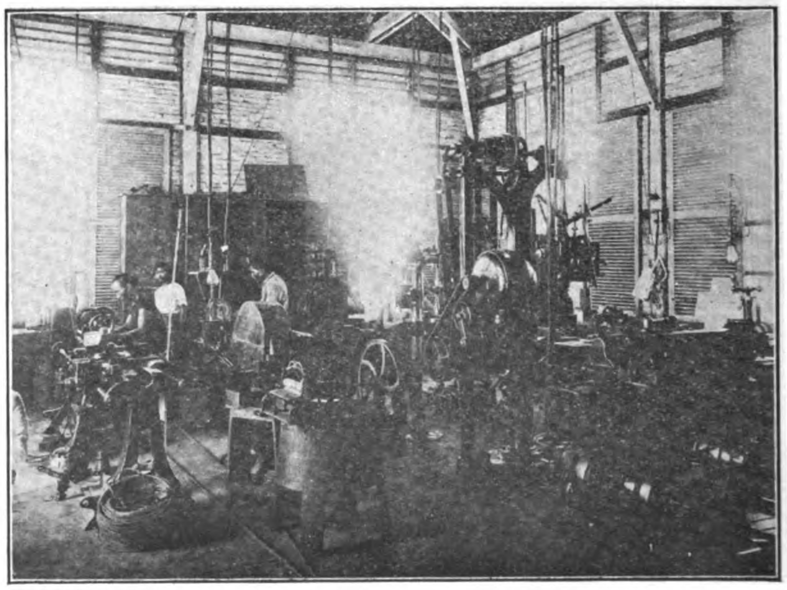


PHOTO-ENGRAVING DIVISION—MACHINERY SECTION



MACHINE SHOP

of Orient labor—that of inducing workmen to report for duty before being impelled by necessity—and it has been successfully adopted by large corporations in the Philippines.

Besides producing printing and binding for the forty-two provinces, 785 municipalities and sixty-four bureaux and offices of the Philippine government, the Bureau of Printing supplies such demands as are made upon it by the military government, the United States naval station, and the Philippine Legislature. It also prints two weekly official gazettes in English and Spanish, four bi-monthly scientific journals, a monthly weather bulletin in English and Spanish, and numerous miscellaneous publications. Sixteen thousand work orders were completed during the past fiscal year. The Bureau maintains its own transportation and delivery systems, handling an average annual output ot approximately 175,000 packages.

Bureaux of the Philippine government are not permitted to enter into competition with private firms or individuals, but may do such work as is requested by parties who are unable to secure their needs in the local market. In this way considerable printing of the better class is handled every year by the Bureau of Printing. This is particularly true of the photo-engraving division, which furnishes illustrations not only for the Philippines but also for cities of China.

The accounting system of the Bureau of Printing has been commended by expert accountants whose services have at times been utilized by the Philippine government The most important problem confronting the progressive printer and publisher of to-day is that of devising a cost system which will accurately show the cost of the manufacture of his product. The Bureau of Printing has had in operation for several years a cost system which embodies all of the good features of those so far discussed or adopted by cost commissions and is superior by reason of its simplicity in compiling data.

The Bureau of Printing purchasing system provides at all times an adequate quantity of stock. As all materials entering into the product of the plant are imported, and as from five months to one year are required for delivery, necessity has evolved a system which provides against all contingencies through a series of alarms, which show when the supply has reached the point which will admit of the receipt of a new order before the amount on hand shall have been expended. With such modifications as were required to meet local conditions, this system has been universally adopted by the Philippine government. The utility of the accounting system in general has been demonstrated through its application to the Government Printing Office at Washington, where it has been favorably commented upon by the Public Printer in his annual report for the past two fiscal years.

The work of the Bureau of Printing is of such high character that it is conceded to be the leading exponent of letterpress printing in the Far East. It has set a high standard for commercial printers and aids in its maintenance by honoring every requisition for thoroughly trained workmen that may be made by local publishers. The plant is valued at $500,000 in United States currency. It is provided with facilities for the production of every operation known to letterpress printing. The composing division is equipped with fourteen modern single and double-magazine Mergenthaler linotypes, Miller linotype saw and trimmer, Wesel steel imposing stones, iron case racks and stands, Porter cabinets, Universal brass rule saw, Golding rule and slug cutters, and Washington hand, Wesel self-inking and Hoe flatbed signature proof presses; tables and all sorts of cabinets are of narra hardwood.

The photo-engraving division is equipped with an Anthony & Scovill enlarging, reducing and copying camera and a Levy process camera, with color filters for three and four-color process work; Levy half-tone screens, from 65 to 400-line; Macbeth ultra-violet inclosed and Colt open arc lamps; Wesel fountain air brush and pump, Washington hand press, Royle radial arm router and beveling and lining machines; Ostrander-Seymour trimmer and Royle cabinet and jig saws, column drill, and negative squaring machine; Royal and Wesel oval and circle cutters and Ideal printing frames.

The stereotyping and electrotyping division is equipped with black-leading, hand and power curving, rotary planing, planing and roughing, revising and plate-mortising, Royle routing, sawing and trimming, hand and power shaving, Hoe shaving, beveling and squaring, wax shaving, and Wesel lead and slug shaving machines; ingot, lead and slug, and metal furniture molds; hand proof, hand electrotype molding, hydraulic cylinder pump, Lovejoy hydraulic electrotype and hydraulic pressure-gauge presses; Royle, cabinet and combination jig and drilling machine saws, and steam drying table.

The press division is equipped with Miehle cylinder, Harris automatic, Colt's Armory, Universal, Chandler & Price Gordon presses and Carver & Swift embossing presses, automatic feeding attachments, a complete roller-making outfit, consisting of a steam-jacket reducing kettle, pressure kettle, air pump and roller extractor, and an 18-inch 3-roller ink mill.

The bindery division is equipped with Dexter folders and feeders, Latham stitching and sewing machines, Smyth book-sewing machines, Singer sewing machines, Seybold book compressor, Brown & Carver and White cutters, Peerless and Latham perforators, Seybold rotary board cutters, round-cornering and index cutters, Hickok ruling machines, Sheridan stamping machine, and the latest models of back-molding, paging, numbering, roller-backing, punching, rounding, paring and trimming machines.

The machine shop is equipped with a 20-inch shaper, lathes, large and small drill presses, grindstones, emery wheels and surface, drill and knife grinders.

Each machine in the plant is operated by its own individual electric motor, either direct or gear connected. Electric current is supplied by the power plant, which is provided with two 100-horsepower Economic fire-tube boilers, driving two 75-horsepower Ideal engines, direct connected to two 50-kilowatt Crocker-Wheeler direct current, 110-volt generators. All apparatus is in duplicate, rendering a shutdown almost impossible. A switchboard of blue Vermont marble, containing recording volt, ampere and watt meters, was designed and constructed by employees. There are eleven feeder circuits for power and lighting, each protected by an individual circuit breaker.

To summarize, the Philippine Bureau of Printing is a large producing establishment as well as a trade school. Its product is manufactured more economically than work of a similar kind in the United States, although all materials consumed are imported from a base of supply located 15,000 miles from Manila, and it pays the liberal gratuities allowed all government employees. It has aroused the native to active interest in healthful outdoor athletics by making the baseball field more attractive than the cock pit. It is fostering thrift in the greatest gamblers under the sun by influencing them to become regular depositors in the postal savings banks. It has received the gratitude of leaders of the Philippine people for its efforts in training boys to become useful citizens, and, in general, it is an institution which is a credit to the American government as well as a monument to the executive genius of its organizer and director, Mr. John S. Leech.

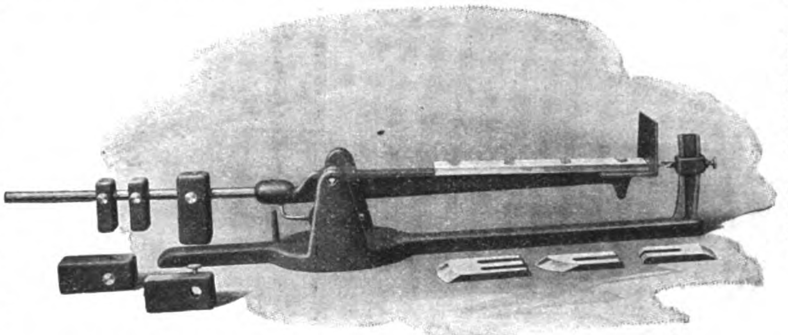
THE NEW "DEFIANCE" KNIFE BALANCING MACHINE

What is said to be the only machine capable of securing an absolutely perfect balance to all classes of knives of every size and shape, revolving cutters, knife-screws, etc., is herewith illustrated and described as the "Defiance" Patent Proportional Knife Balancing Machine.

This machine is too well known to the users of machine knives to require a lengthy description.

Knives could be reduced to the same specific weight by the aid of a common grocers' scales, but that would not attain the object; by the use of the Proportional Balancing Machine the position, as well as the amount of excess of weight, can be ascertained, so that in reducing the knives to the same specific weight they may be made to agree in their corresponding parts. The method hitherto used is by reducing pairs or sets of knives to the same dimensions, and by aid of common scales to the same specific weight: but so great are the differences in the density of the parts of even the same knife, that a still running set of knives is but an accidental result.

In operating, let it be supposed that two or more knives are intended to be fastened into one cutterhead, rotating at a high velocity, and that it be conceded that they must not only be of the same specific weight, but must agree in their corresponding parts. Place each knife in succession on the platform of the Balancing Machine, with its face toward the end-board: with a suitable weight, at the opposite end of the beam; if by this test they all appear to be of the same specific weight, place them each in succession again, with their backs against the end-board; they may still appear to be of the same specific weight; place them each in succession flatwise on the platform, in as many



PATENT PROPORTIONAL KNIFE BALANCING MACHINE

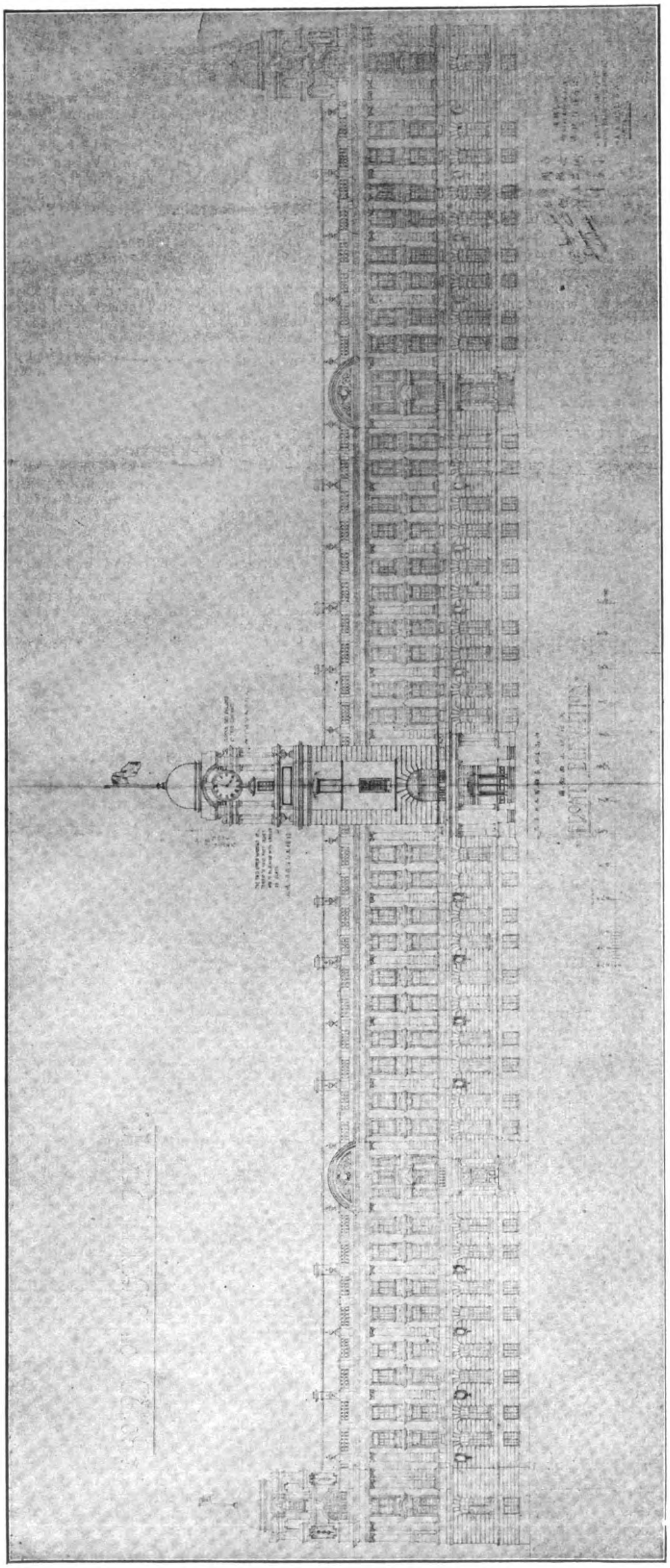
different positions of which they are susceptible, noting and reducing by an indefinite number of trials the edges which are found to be of excessive weight, until they all are reduced to the same weight in their corresponding parts. They will also then, of course, be of the same specific weight. The balance weights are made oblong, so that by putting the heavy end up, the entire mass, consisting of weight, beam and knife, may be poised near its center of gravity, and thereby oscillate more sensitively. If, however, the object to be balanced be very heavy, the weight must hang down, or the upper portion of the mass may preponderate. It will be seen that the operator can make the poise more or less delicate, according to the varied positions of the knives to be balanced.

A more efficient and serviceable tool was never built. Every knife, whether large or small, is guaranteed to be perfectly balanced after leaving this machine and the work produced by them is always uniform and free from defects.

Further information and price relative to this valuable little machine will be gladly furnished by the manufacturers, the Defiance Machine Works, Defiance, Ohio, U.S.A.

MINING

Lepanto Development Co.—The Lepanto Development Company with a capital of P.15,000 has been registered at the Bureau of Archives and will undertake the development of mineral lands in the Philippine Islands. The incorporators are Charles P. Fisher, Harriet Fisher, A. O. Olson, Walter C. Holmes and Jeremiah Ortegas. The capital stock is divided into 150 shares of P.100 each, and of the amount, P.3,000 has been subscribed and P.1,000 paid up.



BOARD OF JUSTICE, PEKING (NOW NEARING COMPLETION)

SUPREME COURT OF JUSTICE
PEKING

What will form an important addition to the few existing government buildings in Peking designed in foreign style, is that presently being erected for the Supreme Court of Justice there. Situated in the Hsin Pu Chi Street in the Western Quarter of the Tartar City, the building is of some considerable extent, having a frontage to Hsin Pu Chi Street of 450 feet, and a depth of approximately 150 feet, and being four storeys in height, it stands out prominently from the immediate surroundings.

The building is designed in a free treatment of the English Renaissance style of architecture, and being set back close on 150 feet from the roadway, it has a decidedly handsome and attractive appearance.

The façade to the street has a rusticated ground floor storey, and two floors above marked by an Ionic colonnade, the whole being crowned by a balustraded parapet. The central feature of the façade is the clock tower, which rises to a height of 110 feet, while at either end of the front there are smaller towers rising to a height of 90 feet. Each of these towers has a dome top, which is covered with copper. The building throughout is built of local made brick, the whole frontage, and the return faces of the corner towers being finished off in cement plaster, while the remainder of the elevations is faced with blue bricks having bands of red brickwork at the sill and lintel courses as well as in the pilasters. The roofs are covered with red tiles also of local make. In the centre of the building are two large courtyards, each measuring 155 feet by 55 feet, thus ensuring plenty of light and ventilation throughout all the rooms in the building.

Access will be obtained from the roadway through two handsome wrought iron gateways, set back some distance from the front boundary, and on either side of the forecourts to same, there will be erected two small gate lodges.

The principal entrance to the building is in the centre of the façade under the clock tower, while there are also other entrances in the front elevation to the right and left of the main entrance, as well as on the side and back elevations, all of which give easy and immediate access to any part of the building. Entering under the clock tower and passing through a vestibule and outer hall, the main entrance opens out into a fine staircase hall, out of which rise the two principal staircases giving access to the upper floors.

The accommodation on the ground floor, on the South side, of the building, comprises two large criminal courts, each having in suite judges rooms, consulting rooms, retiring rooms, and numerous rooms for witnesses and servants. On the North side are two large civil courts with accommodation similar to that for the criminal courts. In addition there is accommodation provided for the law library, secretaries' offices, retiring rooms, enquiry offices, despatch rooms, attorneys' rooms, reporters' rooms, reception rooms, telephone rooms and servants' rooms, while there is ample lavatory accommodation.

On the first floor the principal apartment is the Supreme Court, adjacent to which are suites of rooms for the Chief Justice, the Attorney General, the Judges, the Chief of the Court, and their respective secretaries. On this floor also, there is a large civil court, a general meeting hall and reception room, rooms for the secretaries, a large reading room, and numerous retiring rooms, as well as rooms for witnesses and servants, and ample lavatory accommodation.

On the second floor, there are fifteen suites of three large rooms each, forming offices for the various branches of the courts' work.

In the basement, accommodation will be provided for the heating plant, electrical plant, kitchens, servants, etc., and in addition there is large storage space. In the upper part of the central tower there will be provision made for a clock, with 8 feet diameter dials facing all four ways, and a large bell, both of which should be of great service to the inhabitants of the Western quarter of Peking.

The whole of the sanitary fittings, and the plumbing and drainage work will be carried out in accordance with the latest improvements in sanitary science, the septic tank system being installed for the treatment of the sewage.

The buildings throughout will be heated by steam on the low pressure gravity system, with radiators in the principal rooms and corridors, while an electric light and electric bell installation, and a telephone system are also being installed.

Messrs. A. H. Jaques and Co., Builders and Contractors, of Tientsin and Peking, are the general contractors for the whole of the works on the building, which has been designed and erected under the superintendence of Messrs. Atkinson and Dallas, Ld., Civil Engineers and Architects, 4 Legation Street, Peking.

UNION INSURANCE SOCIETY'S BUILDING, SHANGHAI

The Union Insurance Society of Canton, Limited, which stands foremost among Far Eastern Marine Insurance Companies, demonstrates its enterprise by contracting for the erection of a striking and substantial set of offices on the Bund, Shanghai. The site selected is that hitherto occupied by the offices of Messrs. Dodwell and Co., Limited, adjoining the new Shanghai Club, (illustrated in the July issue of the FAR EASTERN REVIEW) and being at the junction of the Bund and Canton Road gives ample room for the erection of a spacious pile—one calculated to emulate in appearance the handsome Shanghai Club, and enhance the architectural features of the Settlement. The Union Insurance Society went for its designs to a firm long accustomed to Eastern needs and modern development and the result is a handsome plan and specifications for a building which will be the pioneer of its kind in Shanghai.

With a frontage of 100 feet to the Bund and 240 feet to Canton Road, the pile will rise six storeys, and will be of modern renaissance design. On the Canton Road corner a square tower and cupola will be a distinguishing feature. The construction will be of steel skeleton frame, brick and reinforced concrete. The floors will be of concrete, finished with flooring or tiles and the building will thus be fireproof.

The ground floor has been designed to afford up-to-date accommodation for banking and shipping office work. The Union Insurance Company will have its office on the first floor, and two other floors will also be devoted to modern offices. The fourth and fifth floors will be utilised for residential flats, and these will be carried out in the sumptuous style demanded by present-day advancement in the art of living. The roof will be flat, and may be used as a roof garden.

The site is now being prepared, and work upon the foundations will be commenced as soon as possible. The designs are from the offices of the well-known firm of Hongkong architects, Messrs. Palmer and Turner, who have now opened an office in the Telephone Exchange Buildings, Shanghai.

ENGINEERING SOCIETY OF SHANGHAI

At the Annual General Meeting of the Shanghai Society of Engineers and Architects held on November 26 it was decided unanimously to alter the name of the Society to "The Engineering Society of Shanghai." The President, Vice-Presidents and Council were elected for the ensuing year, as follow:

President.—Mr. E. J. Dunstan. M. I., Mech. E.

Vice-Presidents.—Mr. D. O. Dick, and Mr. A. C. Clear.

Members of Council.—Messrs. A. E. Algar, P. H. Cole, J. S. S. Cooper, H. von Heidenstan, P. Peebles, S. J. Powell, F. O. Reynolds, W. F. Tyler, and Mr. W. Wantz.

Hon. Secretary.—Mr. W. J. Williams.

The Society has had a very successful year and during the session most interesting papers have been read.

A hearty vote of thanks was accorded to the retiring President (Mr. T. H. U. Aldridge) and Council.

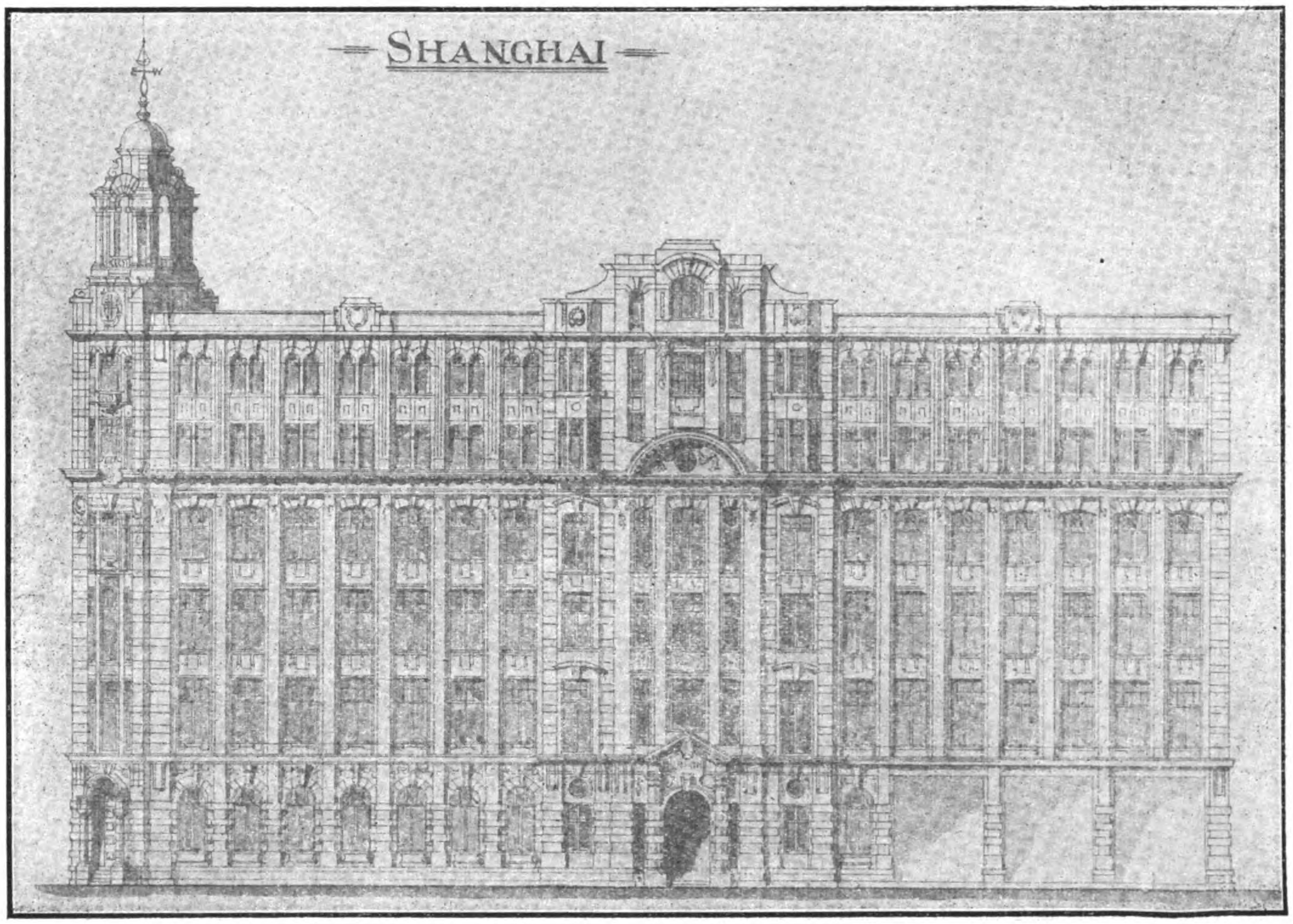
EXECUTIVE ORDER

MANILA, *October 30, 1912.*

It is hereby ordered that all Portland cement that may hereafter be purchased by the Government of the Philippine Islands for use in construction work to be done by or for the Government shall conform in every respect to the specification for Portland cement adopted by the departmental conference at the meeting held at the Bureau of Standards, Washington, District of Columbia, on February thirteenth, nineteen hundred and twelve, and approved by the heads of the several Departments, and promulgated by the President of the United States, and known as the United States Government specification for Portland cement: *Provided, however,* That section 24 shall be modified to meet the local conditions of the climate by reason of the fact that it will be necessary to make tests at a somewhat higher temperature than twenty-one degrees centigrade (seventy degrees Fahrenheit.)

NEWTON W. GILBERT,

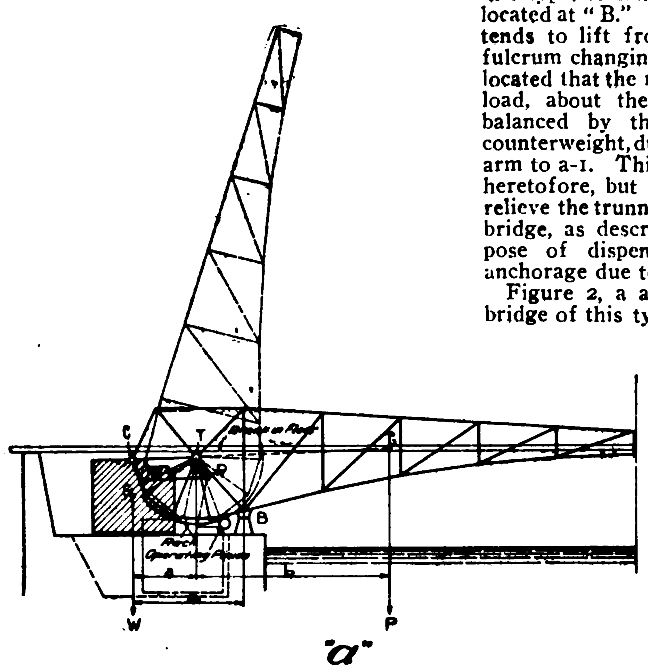
Acting Governor-General.

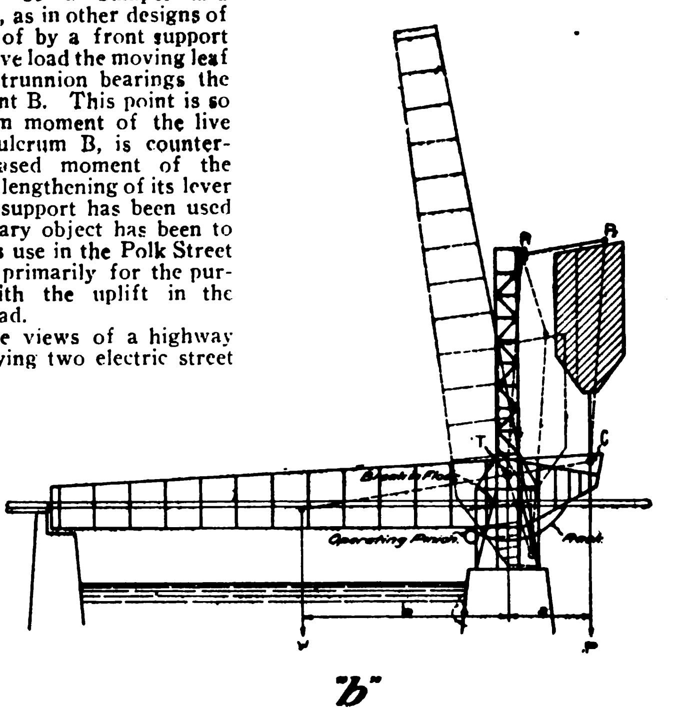


FRONT ELEVATION OF UNION INSURANCE SOCIETY OF CANTON'S NEW SHANGHAI OFFICE

THE STRAUSS BASCULE BRIDGE DESIGN

In the last seven years "The Strauss Bascule Bridge Company," an Engineering firm of Chicago, U.S.A., has developed several designs of trunnion bascule bridge for Railways and Highways, which are very generally used throughout the United States and Canada, and have received marked consideration in Europe. Figure 1 (a-b-c-d) illustrates various modifications of the Strauss design. By inspection it can be seen that the designs are evolved from the plain trunnion bridge, but differing therefrom in general, in the use of an improved and more economical counterweighting device. The following is a brief description of the elemental principals of the respective types, illustrated in Fig. 1.





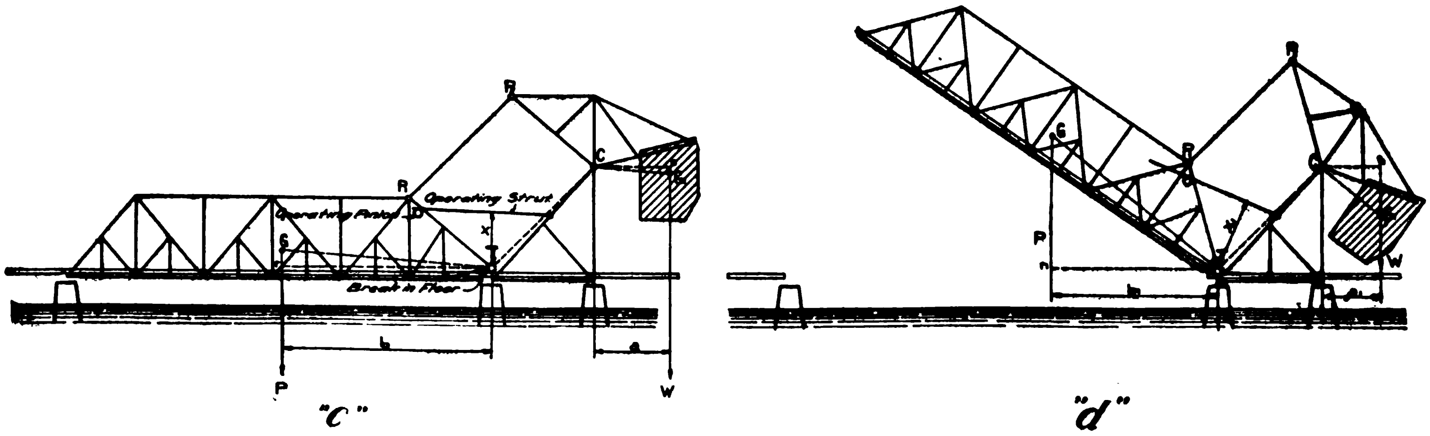


FIG. 1—STRAUSS BASCULE BRIDGE

UNDERNEATH COUNTERWEIGHT TYPE.

This type is one of the earliest designs of the Strauss bridge and as can be seen in Fig. 1-a, is quite similar to the type of trunnion bridge that has been in successful service for over seventy years and as exemplified in the famous Tower Bridge over the Thames river in London. The main trunnion "T," of the moving leaf turns in fixed bearings. The long arm of the moving, or bascule, leaf is counterbalanced by a concrete counterweight which is attached to the tail end of the short arm of the bascule leaf by means of the counterweight trunnion, "C." The conditions which establish equilibrium are that the points C, T and the center of gravity "G" of the long arm lie in a straight line and that P, b=W, a, where P is the weight of moving leaf in front of the main trunnion or fulcrum, and "B" its horizontal lever arm; W, the weight of the counterweight and "a" its horizontal lever arm.

The structure is operated by means of a pinnion which engages with a curved rack attached to the chord of the short arm of the leaf. The counterweight is guided in its motion by the link, P-1, P-2 moving parallel to itself by virtue of the parallelogram T, C, P-1, P-2.

The break in floor is in front of the main trunnion thereby preventing the opening of the bridge under live load. The unbalanced live load on the long arm instead of being counteracted by means of a bumper and anchorage at the tail end, as in other designs of this type, is taken care of by a front support located at "B." Under live load the moving leaf tends to lift from the trunnion bearings the fulcrum changing to point B. This point is so located that the maximum moment of the live load, about the new fulcrum B, is counterbalanced by the increased moment of the counterweight, due to the lengthening of its lever arm to a-1. This front support has been used heretofore, but its primary object has been to relieve the trunnion. Its use in the Polk Street bridge, as described, is primarily for the purpose of dispensing with the uplift in the anchorage due to live load.

Figure 2, a and b are views of a highway bridge of this type carrying two electric street Railway tracks, 193 feet in length spanning the Chicago river at Polk Street, Chicago. The advantage of pivoting the counterweight permits a longer lever arm as compared with types using fixed counterweight and also permits the volume of the counterweight to be disposed beneath the floor in any desired and convenient shape. Concrete instead of cast iron (seven times more expensive than concrete) is usually used for the counterweight, since space is not nearly as limited as in other types using fixed counterweights and only a shallow pit, if any, is required. One of the notable examples of this type is the Palace bridge at St. Petersburg, Russia, over the river Neva, now being constructed. Ten other Railway and Highway bridges of this type are in use or under construction, among which is the four track design to be used over Bronx Kills, New York, in connection with the famous Hell Gate Bridge. The bascules are two in number, each 175 feet in length, and will be used as stationary structures with provision for conversion into barcules later.

OVERHEAD COUNTERWEIGHT TYPE

In many places limited head room between high water and the bridge floor does not permit the use of an underneath counterweight, either without the use of cast iron for counterweight or without resort to difficult and expensive foundation work involving the use of deep pits, which are objectionable. Under these conditions the overhead counterweight type is used with great advantage. In this type, as can be seen in Fig. 1-b, the counterweight is carried above the roadway by means of structural steel legs, which bear on the counterweight pin C.

The counterweight is guided in its motion by the link P-1, P-2 being moved parallel to itself by virtue of the parallelogram T, C, P-1, P-2, as in the underneath counterweight type previously described.

This design as applied to a through girder railroad bridge, 65 feet in length, is illustrated in Fig. 3, being a double track structure over the Saugus river on the line of the Boston & Maine Railway Co. This design also readily lends itself to aesthetic treatment, as the

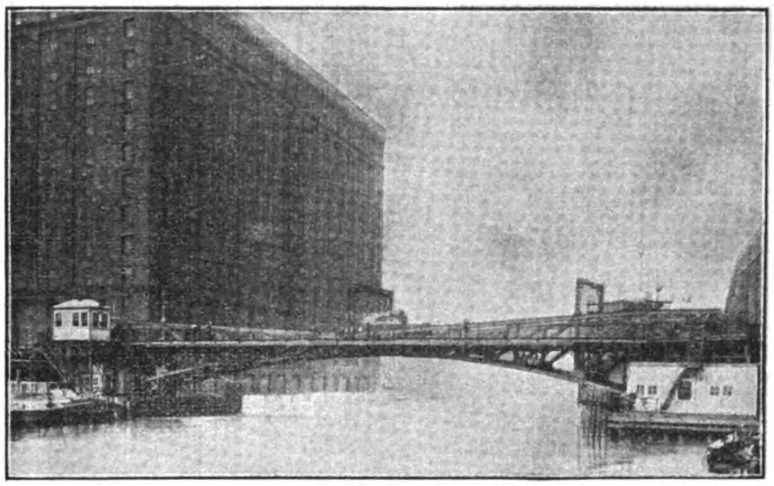


FIG. 2-A—(*See Fig. 2-B*)

counterweight can be designed as an ornamental portal, as exemplified in the Knippel's bridge across the Harbor entrance in Copenhagen, Demark, illustrated in Fig. 4. This latter structure has been in service for four years and during the open season of navigation is operated on busy days sixty times, for the passage of vessels. Other ornamental bridges of this type are the highway bridges at Camden, N. J., in satisfactory service for four years, another structure at Camden and the Osborn Street bridge at Winnipeg, Canada, both under construction. Forty bridges of the overhead counterweight type are in use and under construction.

Heel Trunnion Type

The Heel trunnion type is an overhead counterweight design and is best adapted for through truss spans either for light or heavy traffic. This type of bridge was first introduced by the Strauss Company about three years ago and since its introduction, thirty bridges of this type are in service and under construction. The rapidity with which this design gained such great prestige is due to the fact that it embodies new elements of design which render it not only more economical, but more efficient for through truss spans than any design yet produced, not only as regards superstructure, but for the substructure as well.

Figure 1, c and d, show line diagrams of this type. Point T is the main trunnion, located in the bottom chord of the truss, about which the moving leaf pivots; it is a fixed pivotal point. The counterweight trunnion C, also a fixed pivotal point, is located at the apex of a fixed triangular tower, about which the counterweight frame and concrete counterweight pivot. The counterbalancing effect is applied to the moving leaf through the counterweight link P-1, P-2, connected to the truss and counterweight frame by means of pins at either end. This link is parallel to and equal in length to a line joining the main trunnion T and counterweight trunnion C. In like manner P-1 T is parallel and equal in length to P-2 C. The center of gravity of the entire moving leaf is at G, and the center of gravity of the counterweight and frame is at G.' The moment of the moving leaf about the main trunnion is Pb, in which P is the weight of the moving leaf considered concentrated at G, and *b* is the horizontal distance between G and T. This moment is opposed by the equal moment of the counterweight Wa in which W is the weight of the counterweight and frame considered concentrated at G' and *a* the horizontal distance between G' and C. If Pa=Wb, the structure is in equilibrium considering the bridge closed. The condition in addition to the preceding necessary to establish equilibrium for all positions of the bridge is that line GT must be parallel to line G'C; they will then remain parallel as the bridge operates, by virtue of the parallelogram T P-1 P-2 C.

The dead-load pier reactions are constant and vertical for all positions of the bridge. It will be noted that the dead-load reaction of the rest pier is zero whether the bridge is closed or open. The dead-load reaction of the trunnion pier is practically equal to the weight of the moving leaf; the dead-load reaction of counterweight pier is practically equal to the weight of the counterweight and tower. These conditions are brought about by the separation of the points of support of the counterweight and the moving leaf, but at the same time combining their pin reaction through the connecting members of the parallelogram, so as to cause a resultant vertical and constant load on the piers. The combined center of gravity of the component parts of the entire structure does not move either vertically or horizontally as the bridge operates. For this reason the foundations of a bridge of this type are simple and economical. Moreover, by separating the reactions of moving leaf and counterweight the evils of concentrating the entire load on one pier are avoided As illustrative of this type of bridge, Fig. 5 shows a view of the Northern Pacific Railway bridge in use over the West Waterway, Seattle, Washington, and Fig. 6 shows a view in the open position, of the New York, New Haven and Hartford Railway bridge over the Cape Cod canal at Buzzards Bay, Mass. The moving leaf of these structures is 160 feet in length, the former a single track, and the latter a double track structure.

While only a general description has been given above of other types, on account of its comparatively recent and most successful introduction more detailed explanation is given below concerning the operation and construction of the heel trunnion type.

The earlier bridges of this type are operated by means of pinions located in triangular guides at the hip of each truss, which engage with cast racks bolted in the bottom of straight built-up operating struts, the ends of which carry collar bearings turning on pins attached to the inclined posts of the towers. The pinion and rack are held in mesh by the triangular guide which is mounted on the operating-pinion shaft through bearings at the center of that leg of the triangular guide which is parallel with the center line of the operating strut. The apices of this guide carry wheels which roll along the upper and lower flanges of the operating strut.

The operating pinions are keyed to shafts which extend through the gusset plates of the trusses, and turn in collar bearings bolted to these gussets. These shafts extend toward the center line of the bridge and are connected through reduction gears to the two operating electric motors, and to each other through an equalizer. This operating machinery is located at the portal of the moving leaf, suitable girders being provided to which the motors and bearings are secured. All of the operating machinery is suitably housed and is easily accessible by means of a stairway and hand railing on the end post of the truss. In the later designs of the same type now building, the operating machinery is located on the tower, the operating strut being pivoted at the hip of the truss. These operating struts have proved entirely satisfactory in service. The operator's house, containing the switchboard, controllers, etc., is usually located on brackets extending from the tower base.

When the bridge is closed and ready for the passage of trains, for extra precaution the leaf is locked to the piers at the front end, through there is no tendency for the live load to open the bridge. The locking is effected by means of a latch bar located under the center line of each truss which moves in a guide attached to the bottom chord. This bar passes through rectangular slots in diaphragms between the gussets plates of the truss, and fits securely into a casting provided with a roller, permitting easy movement of the bar longitudinally, which is bolted on an extension of the bridge shoe upon which the truss rests. The locks are driven by one 3-hp. motor. Emergency hand operation is also provided.

Power is not available for opening the bridge locks until the bridge is closed to train traffic and the train signals set at danger. In like manner power for opening the bridge is not available until the locks are fully opened. This condition is brought about by connecting the lock-motor circuit and operating-motor circuit, so that the actual movement of the locks and bridge mechanically completes and breaks the respective circuit, through the medium of contract switches, in their correct order. In closing the bridge, however, power is available for holding the bridge down firmly on the seat while driving the locks. When the bridge, in opening, reaches an angle several degrees less than the total angle of opening, current supplying the operating motors is cut off automatically and the solenoid brakes on the motors are set automatically, the bridge gradually coming to rest at the correct angle of opening. A foot switch in the operator's house at the base of the controller permits the operator to release the solenoid brakes at will. Besides the solenoid brakes an emergency brake is also provided which can be instantly brought into play by the operator. A casting is also provided on the triangular operating guide, which at the extreme limit of motion comes in contact with an oak bumping block located on the operating strut at its extremity near the operating strut pin; however, these blocks seldom come into contact. as the bridge is easily kept in control by the use of the brakes. Signals indicating the successive positions of the locks and bridge proper, consisting of incandescent lamps which show

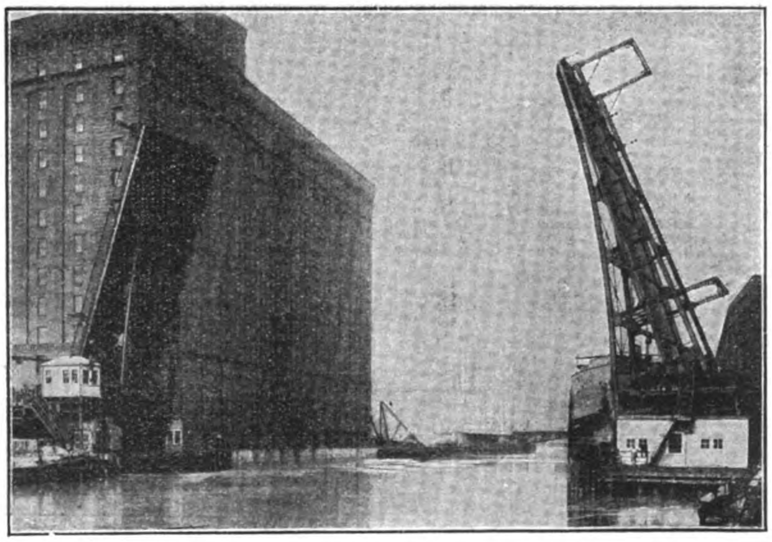


FIG. 2-A—UNDERNEATH CTRWT. TYPE (*See Fig. 2-A*)

Double Track Electric and Highway Length of Span 193-0" Over Chicago River at Polk St., Chicago, Ill.' U.S.A.

through colored lenses and which light automatically when the position of the lock or bridge which they indicate is reached, are placed in the operator's house convenient, to his vision. These signals are labeled corresponding to the different positions of the locks and bridge which they indicate.

An air cushion is located at the center line of the bridge attached to the front-end floor-beam. It consists of an air cylinder and piston, the rod of which strikes a plate bolted on the rest pier as the bridge closes, and compresses the air in the cylinder so as to absorb shock. The cylinder is provided with a valve capable of regulation so that the air in the cylinder can be compressed in greater or less degree, as occasion may demand. In practice the balancing of the bridge is such as to render these cylinders precautionary only.

To guide the operator in closing the span a target is attached at the end of the leaf on the lower chord and a similar target is located on the top of pier; the two halves of these targets are painted different colors, so that when the bridge is properly closed the different colored halves of each target are in plain view of the operator and serve as the most direct guide in the proper handling of the bridge. At night electric and oil lamps illuminate the targets.

Besides the electric operation employed on all of these bridges, emergency hand operation is also provided. In some of these bridges gaseline engine equipment is provided as well; the engine is located in a fixed enclosure at the trunnion opposite the operator's house, and is connected to the machinery at the portal of the moving leaf by means of bevel gears and a shaft turning in bearings bolted to the outside web of the end post of the truss. When hand operation is used the motor shafts are connected to a cross shaft by means of sprocket wheels and chains, and the cross shaft has keyed to it grooved sprocket wheels which carry chains extending down to the bridge floor, furnishing a convenient means of applying power by hand. From four to eight men can be effectively employed in operating the bridge. The Red River bridge of the Transcontinental Railway was easily operated by two men in either direction when first moved. The hand operation on these bridges is designed so that the bridge can actually be operated, in case electric or other power is not available, within a reasonable length of time.

In moving the bridge, the power applied by the operating pinion at the point of tangency with the pitch line of the operating—strut rack, acts with a leverage equal to the perpendicular distance from this pitch line to the trunnion of the moving leaf. Referring again to Fig. 1, this distance is indicated by the dotted lines.

This machinery lever arm increases as the bridge opens, which means that as a greater surface is exposed to the wind in opening the bridge the leverage through which the power acts increases. This, while of little consequence, is rather an interesting feature of the design.

In one of these bridges, for the Peoria and Peking Union Railway Company, it was found advisable, in connection with the interlocking plant, to locate the operator several hundred feet distant from the bascule span in the interlocking tower at the crossing of the C., R. I. and P. Railway. In order to simplify and increase the safety of the electrical installation and operation under these conditions, the main controllers, circuit breakers, contact switches, etc., were located in a suitable fixed inclosure on the tower span of the bascule, but are operated by auxiliary controllers located in the interlocking tower. The conductors from the instruments at the command of the operator to the main equipment at the bascule span carry only very light current. The operator, instead of closing the switches and operating the controller directly by hand as when stationed right at the movable span, as in the other structures, does so at a distance through the medium of the auxiliary equipment, which requires, of course, very little expenditure of power to operate. This method of operation from a distance is made possible and safe mainly on account of the accurate balance of the structure and the use of the automatic cutoffs and the check system of signals indicating the successful positions of locks and leaf, which serve as a reliable guide to the operator even though not located at the bridge itself.

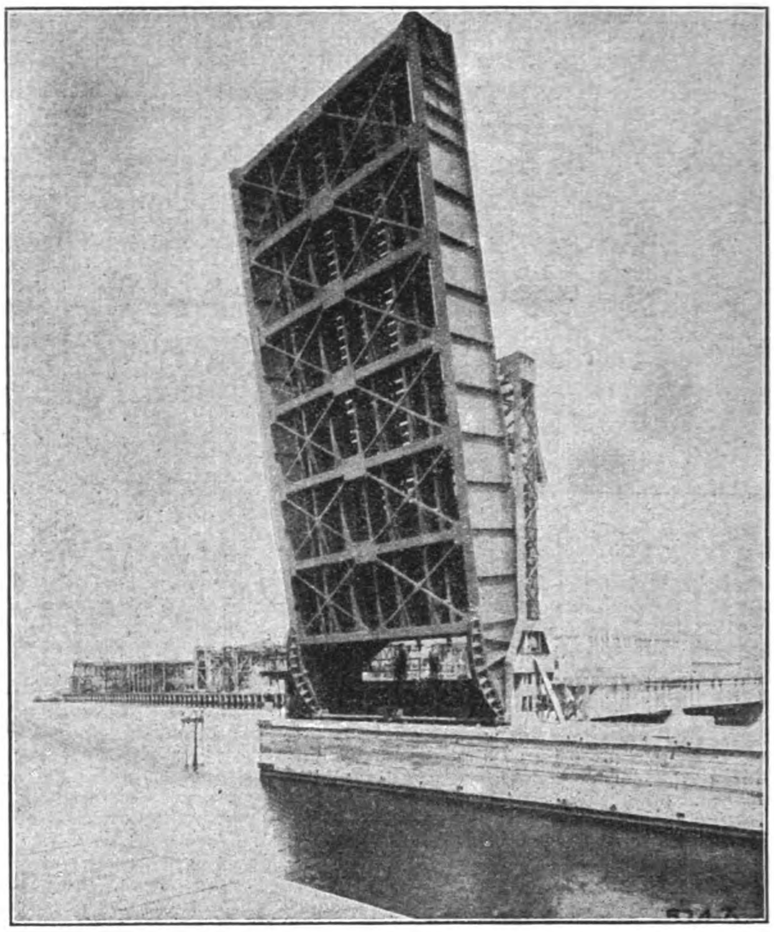


FIG. 3—OVERHEAD CTRWT. TYPE BOSTON AND MAIN R. R

Double Track. Length of Span 65'-0". Over Saugus River near Cambridge, Mass., U.S.A.

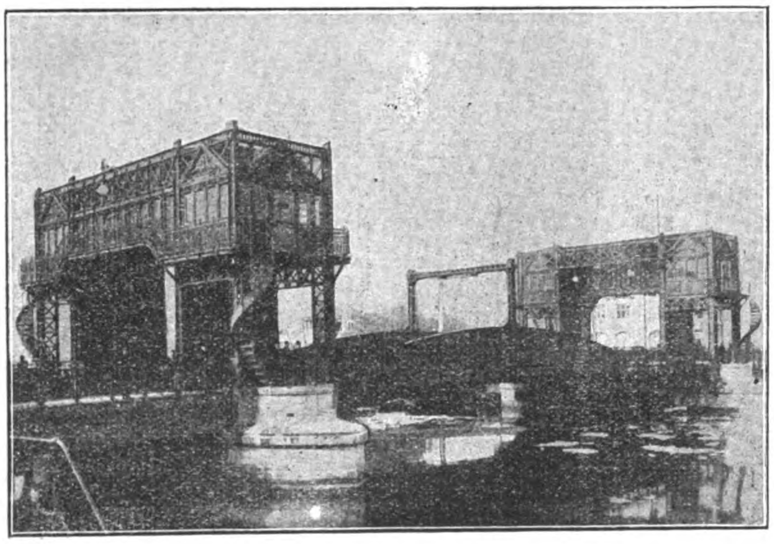


FIG. 4—OVERHEAD CTRWT. ORNAMENTAL TYPE

Double Track Electric and Highway. Length of Span 109'-2". Over Harbor Entrance Copenhagen, Denmark

The trunnion is composed of a pin made of forged steel and a cast-steel collar of considerably larger diameter: the pin, designed to take care of the bending and shear only, extends through the gusset and bearing plates of the truss, being held by Lomas nuts in the same manner as in a fixed pin-connected span. The cast-steel collar, which turns in the phosphor-bronze bushing of the journal bearing, is made of sufficient diameter to provide ample bearing surface and permit of relative motion with very little friction. This collar also furnished a convenient and effective means of securing the trunnion to the truss, by a circular series of bolts extending through the collar and the gusset and reinforcing plates of the truss. The counterweight trunnion and bearing at the apex of the tower are detailed in a similar manner. In the earlier designs (see Fig. 6.) the tower and truss of the moving leaf are not in line; the trunnion is held in fixed bearings, one located in the base of the tower and the other on a pedestal bolted to the pier, forming fixed bearings symmetrical about the center line of the truss, the journal bearing being fixed to the truss and rotating about the fixed trunnion. In the later designs, (see Fig. 5) the trunnion is carried by the truss and turns in a single journal bearing located at the base of the tower.

The advantages over the original design gained by arranging the towers in line with the trusses are as follows: Both the main trunnion and counterweight trunnions are less than half as long as in the original design; the bending moment is reduced to a minimum; both inside trunnion pedestals are dispensed with; and the distance center to center of tower posts is reduced about 5½ feet, thereby effecting a considerable saving both in the piers and the superstructure of the tower.

Since the trunnions are located directly at the pier tops, the points of resistance to lateral stresses are practically at the pier tops, giving maximum stability. This lateral stiffness insures quite perfect alignment of the trusses.

The counterweight proper is composed of concrete, and in most cases is held in a structural-steel box riveted to the counterweight frame. In the case of the Northern Pacific bridge and some other's the box is omitted, the concrete counterweight being thoroughly reinforced so that it is self-sustaining. Pockets are left in the counterweight so that weights can be added or deducted and a perfect balance obtained.

All parts of the bridge are thoroughly braced, the moving leaf in this respect being no different from a fixed simple span (and under live load it acts as such). The counterweight

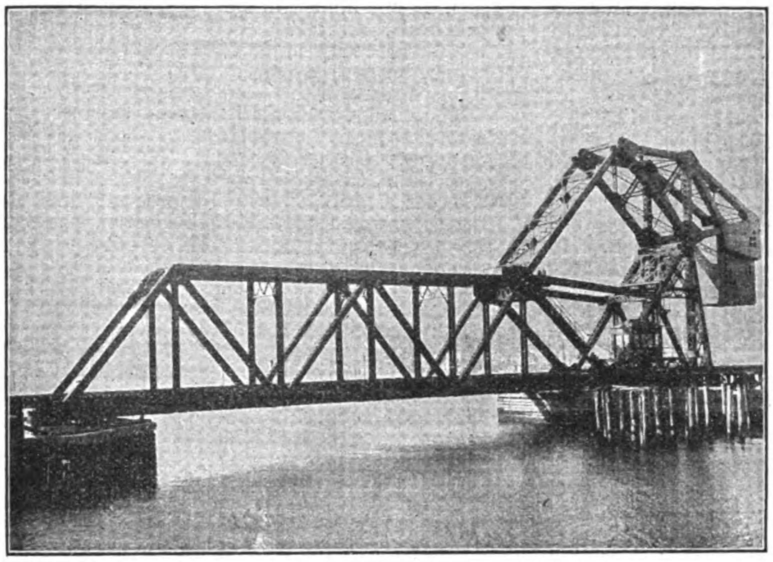


FIG. 5—HEEL TRUNNION TYPE—NORTHERN PACIFIC RAILWAY

Single Track. Length of Span 160'-0". Over West Waterway, Seattle, Wash., U.S.A.

tower has stiff portal braces both in the planes of the inclined and vertical posts, and the vertical posts are braced laterally by inclined members which extend from the counterweight pin down to reinforced-concrete brackets on either end of the counterweight pier. The counterweight trusses are braced together by mean of struts and diagonals, and the same is true of the counterweight links.

In the case of the Cuydhoga River bridge for the Erie Railroad it was found necessary to maintain railway traffic during erection. In order to accomplish this, provision was made in the design so that with the bridge open the lowest point of the counterweight would not encroach on the standard railway clearance. The old swing bridge was 220 feet in length, giving two narrow channels. The new structure was so located that the old pivot pier with modifications could be utilized for the rest pier of the bascule, and, the new span being 180 feet in length, the new trunnion and counterweight piers were built clear of the old rest pier of the swing. The latter was removed on completion of the new bridge.

An interesting feature in the construction and operation of these bridges is that the design is such as to reduce to a minimum the cost of maintenance, since all movement involving actual contact of materials takes place within exceedingly small compass, all such parts being completely protected from possible interference of extraneous influences. Furthermore, these moving parts are readily accessible for inspection and attention, thereby still further insuring against possibility of derangement. The performance of these bridges in actual service has been satisfactory, traffic not having been delayed either over the bridge or on the water.

Among recent designs of the heel trunnion type as illustrating its wide range of usage and adaptability, might be mentioned the following:

The 235 foot double track single leaf design for the Baltimore and Ohio Railway now nearing completion in Chicago, a duplication of which is soon to be undertaken adjacent to the bridge now being erected. The structure when open will stand as high as a twenty-story building and it is the longest single leaf bascule bridge in the world.

The 118 foot single leaf four track bascule now being constructed by the New York Central lines at Port Clinton, Ohio. This structure is the first four track bascule designed to lift as a single unit.

The 186 foot double track Railway and highway bridge erected by the Canadian Pacific Railway at Fort William, Ontario. This structure carries a double line of railroad tracks on the lower deck and a double track electric line and highway on the upper deck, being the first bascule bridge, ever built as a double deck structure.

The 336 foot single track double leaf design also being built by the Canadian Pacific Railway Company across the new United States ship canal at Sault Ste. Marie, Michigan. In this design the two leaves of the bridge when closed lock together. The top chords by means of compression locks and the lower chords by means of tension locks. The bridge when closed under live load acting as a *simple span* 336 feet in length. Heretofore double leaf bridges were designed as cantilevers, generally with a shear lock joining the leaves at the center, and, as typified in the highway bridge shown in Fig. 2; or as arches under live load, as typified in the highway bridge shown in Fig. 3.

For the bridge at Sault Ste. Marie neither of the preceding designs could apply on account of the extreme length of span and other local conditions. The cantilever design for Railway use is objectional on account of the heavy anchorages required, the deflection and play at the center and its higher cost and maintenance. A three hinged arch as in the Copenhagen design could not be used on account of the limited head room above water level. The length of span required, 336 feet, is also beyond the safe limit for a single leaf bridge. The simple span design used, eliminates these objections and at the same time permits the use of two independent leaves, thereby permitting the most economical and safe design and operation of the structure, considered from the standpoint of a movable bridge. Ample provision is made for expansion and contraction due to variations in temperature, and the locks are so operated as to prevent any wear taking place due to the sliding or movement of one surface against another. The entire super-structure, including counterweight towers at either end and complete operating and lock machinery cost about $155,000. The foundation consisting of four piers costs about $10,000 complete; the low cost being due to the excellent foundation conditions.

The designs of the Strauss company are worthy of careful consideration for any case where movable bridges are required. They act in the capacity of consulting and designing Engineers, furnishing complete plans and specifications.

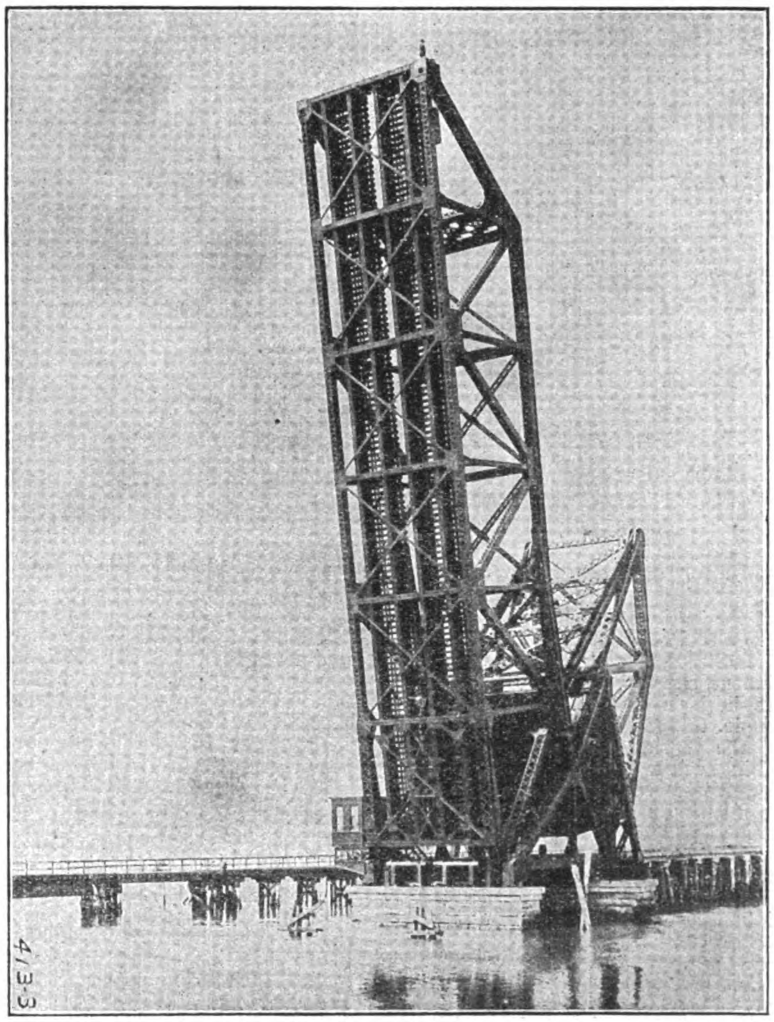


FIG. 6—HEEL TRUNNION TYPE—N. Y. N. H. AND N. R. R.

Double Track. Length of Span 160'-0". Over Cape Cod Canal, Buzzards Bay, Mass., U.S.A.

"AMERICAN" HIGH DUTY TOOL ROOM LATHE

"American" High Duty Tool Room Lathes are built in four (4) sizes, 14 inch. 16 inch, 18 inch and 20 inch. The basis of these lathes is the regular "American" High Duty Lathe with Patented Drop Vee Bed, Double Plate Apron, Patented Quick-Change Mechanism affording 48 thread and feed changes, Phosphor bronze bearings, etc., as described in the circulars covering the standard machines.

The term "Tool Room Lathe" is generally understood to mean a lathe fully equipped with the various attachments, such as the Taper, Draw-in and Relieving Attachments that are required to handle all classes of Tool Room Work. This type of lathe is also usually furnished with a pan for retaining the lubricant which must be used when working on hard steels.

It is not always necessary, however, for a tool room lathe to have all of these attachments, and we are therefore prepared to furnish any one of them separately.

In the following we shall not try to give a description of the entire lathe as that is taken care of by our regular circulars, but will devote our endeavors to a comprehensive description of the various attachments which are essential to a tool room lathe.

Taper Attachment.—The "American" Taper Attachment, shown by the accompanying illustration, is both in design and operation extremely simple, the construction being such as to avoid the spring and inconvenience usually found in such a device. All parts are amply heavy and numerous sliding joints are avoided, thus insuring a rigid mechanism and accuracy of tapers produced therefrom.

Bolted to and traveling with the carriage, the taper attachment can be instantly thrown into operation at any point along the lathe bed, by simply tightening one binder nut (J) on clamping dog, or can be as easily disengaged by releasing this nut.

When attached for taper work, the sliding shoe is directly connected with bottom slide of the tool rest by a heavy cast iron yoke, making its operation instantaneous, at the same time doing away with all lost motion, weakness and inaccuracy found in taper attachments directly connected with cross feed screw.

The Cross Feed Nut is always connected with the tool rest, therefore it can not fall to one side and out of position.

Nut for engaging the Sliding Shoe is arranged to slide in a slot in the yoke connected with tool rest, and is attached to or released from the yoke, as the case may be, by tightening or loosening a single screw.

Accurate Graduations are provided for quickly setting to any desired taper within its range, and in addition there is provided a convenient hand screw with graduated collar, used for extremely accurate setting.

When Taper Attachment is ordered *before* lathes leave our works, all work necessary to its application is finished so lathe and attachment reach customer ready for use, without any further work being necessary on his part.

When Taper Attachment is ordered *after* lathe leaves our works, it can be readily applied by the user, as all our lathe carriages are drilled to jigs, and properly tapped ready to receive a taper attachment, with a small amount of fitting. Complete information relative to such fitting is furnished by us. There is no necessity of a planed strip on the bed, or any work except a slight amount of fitting to the carriage.

Relieving Attachment.—For Application to 14", 16", 18" and 20" "American" High Duty Lathes. The function of the Relieving Attachment is to relieve or back off the flutes of rotary cutters, taps, reamers, end mills, hollow mills, dies, etc. Heretofore, all of the relieving attachments on the market have been limited in their capacity for handling different classes of relieving work and to the different types of lathes to which they could be applied, therefore were not universal in their action.

In order to successfully overcome these limitations the New "American" Universal Relieving Attachment has been designed along original lines with the result that this attachment is completely universal in its operation as will be evident from the fact that end and internal relieving can be just as easily performed as straight relieving work, such as relieving cutters, taps, hobs, etc.

In addition, this new design has eliminated the many objectionable features common to other makes, such as numerous shafts, mitre gears, racks, etc., and as a result the New "American" Relieving Attachment is very simple and efficient in its design, only a few parts being used to accommodate a very wide range of work and to provide an unusually direct drive.

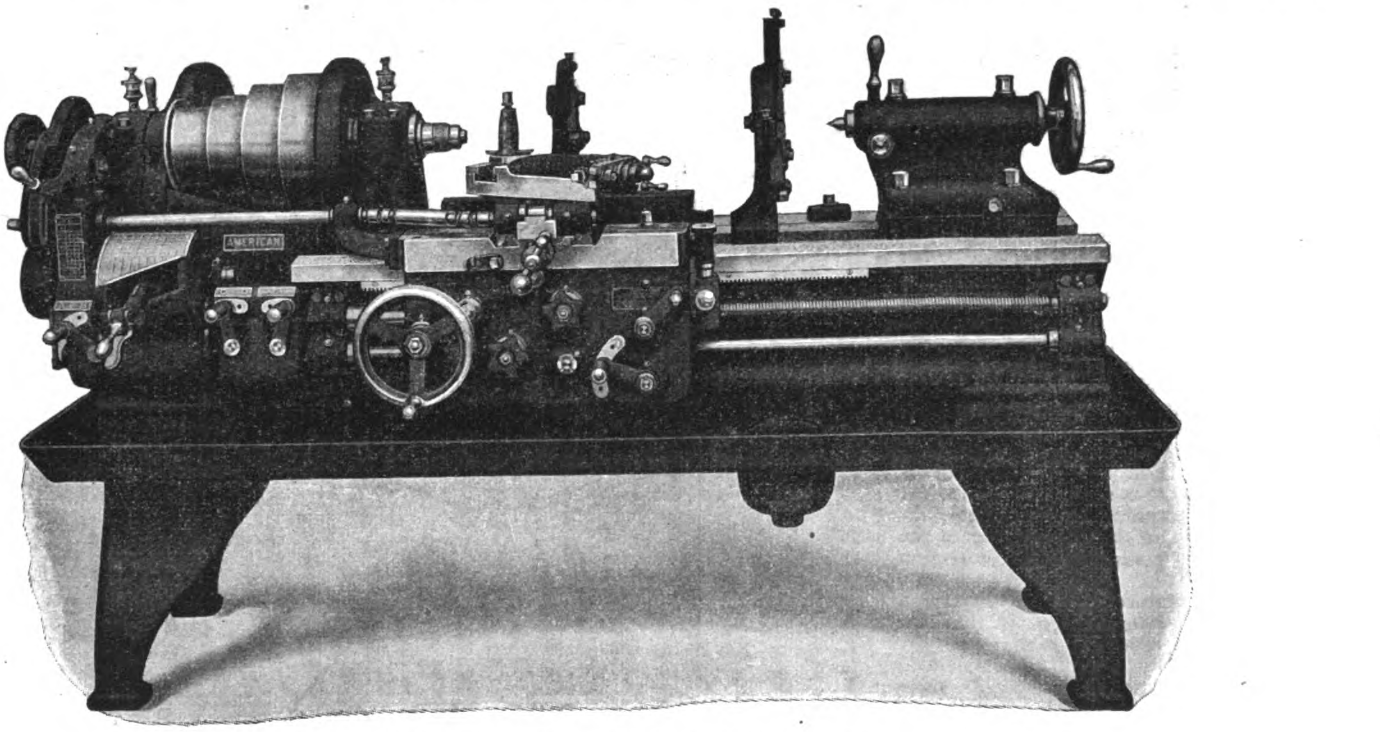
One of the important features of this new attachment is that it can be used with any type of "American" High Duty Lathe. In other words the application of this relieving attachment is not limited to one type of lathe as are practically all other similar attachments, but can be as easily applied to and operated in connection with a geared head or motor driven lathe as it can with a cone head lathe.

The change gear mechanism is supported by a bracket located at the front of the headstock on top of the quick change gear box. The gear train has a small quadrant which carries the change gears, and which is used to disengage the drive when not required. Power is taken from a spur gear located on the end of the spindle and is transmitted through the change gear mechanism to the driving shaft which extends through the supporting bracket on the quick change gear box and is journaled at the other end in a suitable bracket fastened to the left wing of the carriage. Between this bracket and the tool rest are located the Universal or knuckle joints which permit cross movement to the tool slide.

The driving shaft revolves constantly in one direction until the direction of the spindle rotation is reversed, at which time the driving shaft ceases to reciprocate the tool slide. This feature is of great value, for by means of it the tool slide will remain stationary when the direction of the carriage travel is reversed while the half nuts are engaged. By means of this same feature the tool can be withdrawn from the work and run back for a new cut, as is the practice in tap and hob making, without any waste motion of the parts and with absolute safety to the cams. This feature alone represents a very important advance in the development of the Relieving Attachment, and greatly increases the efficiency of this mechanism.

To obtain this condition a clutch connection is used between the cam and the driver which is operative in one direction only, therefore when the cam is set for operating in one direction the reversal of the driving shaft will cause the clutch, which is held in engagement by a spring to be withdrawn from the cam with the result that the cam will remain stationary and consequently will impart no motion to the tool slide.

In order to obtain the entire range shown on the index plate, three cams, of one, two and four rises respectively, are provided in addition to the change gears. These cams run in an oil bath, are carried on the cam shaft which is located directly in front of the tool slide and can be very readily interchanged when desired. It will be noted by reference to the index plate that the most commonly



"AMERICAN" HIGH DUTY TOOL ROOM LATHE

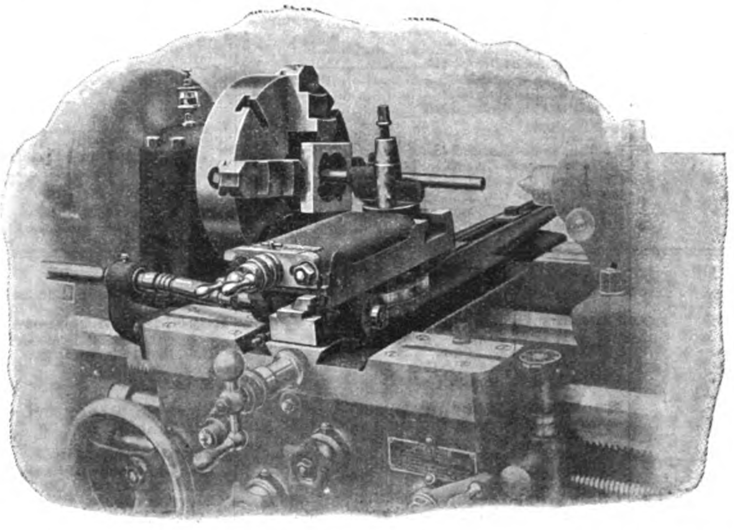
used number of reliefs are obtained by making the slightest changes.

Probably the most important and valuable feature of this new attachment is that which permits the tool slide to be operated at *every* 30 degrees, thus providing twelve (12) operating positions within a circle. It is this feature that permits of relieving side cutters, end mills, and numerous jobs that heretofore could only by done by hand. On practically all other attachments that can accommodate this class of work, certain changes in, and additions to the regular equipment are necessary to make them operative on internal and end relieving work. On the "American" Relieving Attachment, however, aside from the simple adjusting of the tool slide to its proper position, there is absolutely no change or readjustment of the mechanism required.

pattern size after the machine has left our factory, the application requiring only a slight amount of work on the customer's part.

Draw-in Attachment.—The Draw-in Attachment is a very simple mechanism consisting of a long hollow steel bar, a hardened and ground steel taper bush and as many collets as are necessary for holding different diameters of work.

The hollow bar which extends through the spindle has a wooden hand wheel at one end and is threaded internally at the other. The hardened and ground bush fits into the spindle nose and the collets are placed in this bush, the threaded end extending through and being engaged by the thread chased on the inside of the bar. The stock which is to be turned is passed through the bar from the head end of



HIGH DUTY TOOL ROOM LATHE—SHOWING INTERNAL RELIEF

Very convenient means are provided on this attachment for obtaining the various degrees of relief for either external or internal work. The adjustment takes place at the front of the tool slide through a thumb screw, while a graduated scale indicates the depth of the relief as set.

As a further proof of the adaptibility of this attachment, it can be applied and operated absolutely independently of the taper attachment. In other words, as far as the relieving attachment itself is concerned, a taper attachment is not required except when taper work is to be handled.

A standard compound rest is furnished in addition to the special relieving rest, the use of which for general turning purposes we strongly recommend, for naturally the constant use of a precision tool for rough work will impair its accuracy and unfit it for high grade tool room work.

As the compound rest is readily interchangeable with the special tool slide of the relieving attachment, only a few moments are required to make the change.

When necessary to relieve taps or hobs having spiral flutes, the "American" Relieving Attachment can be easily arranged to handle such work by the simple addition of extra gears.

The parts used in the construction of the "American" Universal Relieving Attachment are of the very best material for the service required. The cam yoke is forged. The cams, cam shoe and crank members are of tool steel, hardened and ground. The index bar in the top slide is of forged steel, all shafts and gears are well proportioned, and the entire mechanism is free from trappy construction. The compactness of the elements and their proper relation to each other overcome any tendency to chatter or backlash. All gears are securely covered.

The "American" Universal Relieving Attachment can be applied to any "American" High Duty Lathe below the 24 inch medium

the lathe and is gripped in the collet or chuck. The turning of the hand wheel, in one direction or the other, causes the collet to either engage or disengage the work. Collets can be furnished for holding stock from the smallest fraction of an inch up to $\frac{7}{8}$ inch diameter on the 14 inch and 16 inch sizes and up to 1 inch diameter on the 18 inch and 20 inch lathes.

Oil Pan.—There is very little to be said in connection with the oil pan, aside from the fact that it is made from sheet iron, its purpose being to catch the waste lubricant and thus prevent it from running off into the floor and being wasted.

Quality.—The "American" Tool Room Lathe is of very recent design, and embodies a number of original features which are described in our High Duty Lathe Circular. We guarantee the workmanship on these machines to be the very best that intelligent effort, combined with long experience, skilled workman and a complete jig and tool system can produce, and likewise positively guarantee every piece of metal that enters into the construction of our tools.

LIGHTING AND POWER

Electric Lighting for Cebu.—A franchise for the supply of electric light to the city of Cebu was granted by the municipal council of that city to Manuel D. Mambromati, on October 3. The franchise has been accorded for a term of 35 years, the contractor pledging himself to establish and maintain 1,000 twenty-five candle power lights at different locations throughout the town, to be determined by the city authorities.

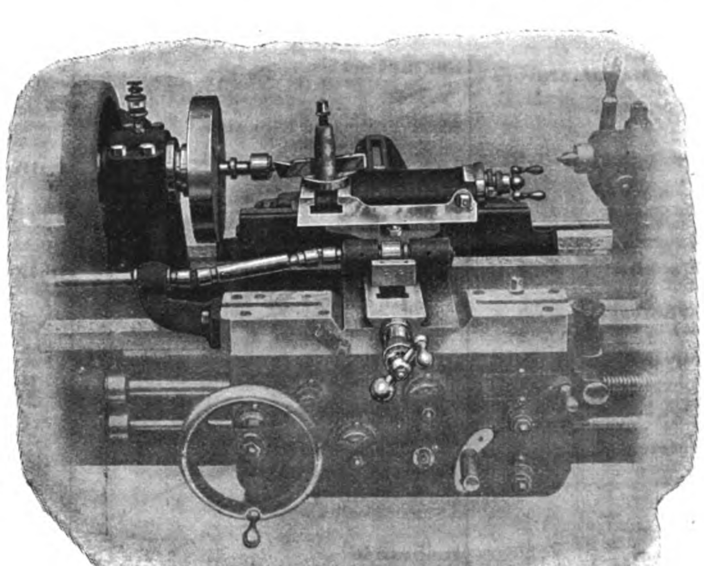
Manila Gas Company.—The Manila Gas Company has awarded the contract for the construction of the company buildings and tanks to Merritt and Wilson, the local contractors, and work will be begun immediately. The construction will approximate 100,000 pesos.

Articles of incorporation of the Manila Gas Corporation were filed on Oct. 17, with the executive secretary, and the company has been authorized to transact business in the islands as a local corporation.

Horace L. Higgins, who engineered the franchise for the gas company, W. A. Kincaid attorney for the corporation, Paaul Nagel, treasurer, Paul Grossman, constructing engineer, and Phil. C. Whitaker, are the incorporators. With the exception of Mr. Grossman the same gentlemen compose the directorate. Richard Dunkel is named as a director in the place of Mr. Grossman.

The company incorporated for P.1,500,000, divided into 15,000 shares of stock at P.100 par value per share. Of this amount P. 300,000 has been subscribed, and P. 75,000 paid in.

Its articles of incorporation authorize the company to take over the franchise granted to the Schweizerische Gasgesellschaft, of Zurich, Switzerland, to construct and operate a gas plant in the city of Manila, and to engage in such subsidiary commercial activities as may be necessary in the conduct of such business. The Swiss company is the principal stockholder in the new corporation.



HIGH DUTY TOOL ROOM LATHE—SHOWING END RELIEF

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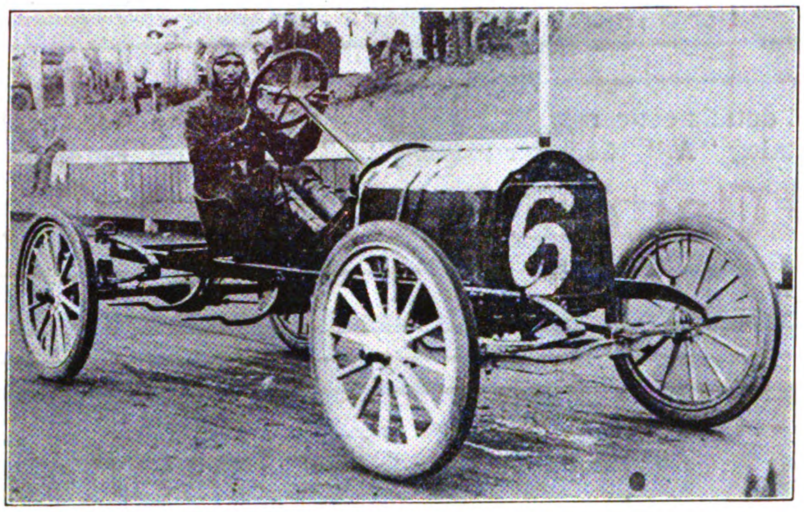

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THE FAR EASTERN REVIEW

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Engineering

Finance ❀ Commerce

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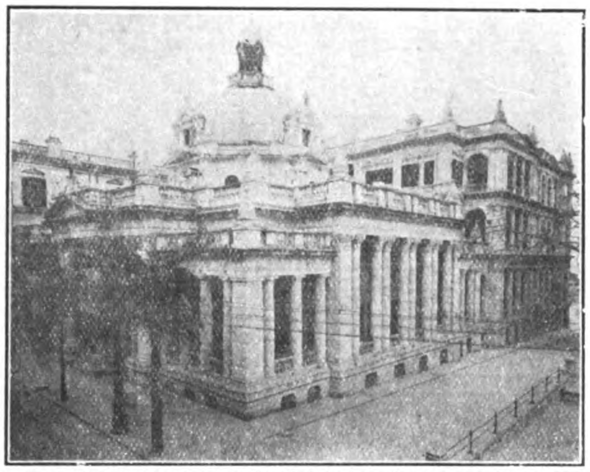

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COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, DECEMBER, 1912 No. 7

THE SALT GABELLE OF CHINA

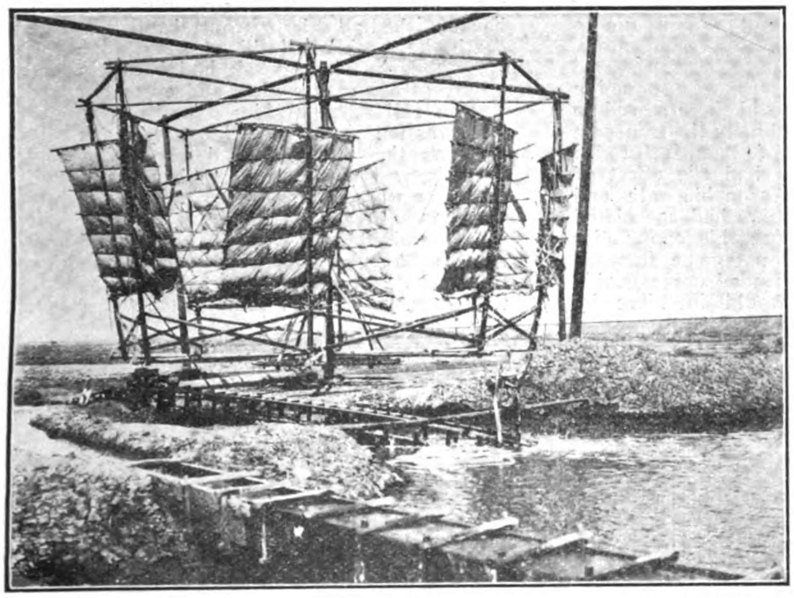
DESCRIPTION OF THE ADMINISTRATION OF THE SALT TAX AND ADMINISTRATION OF THE SALT INDUSTRY

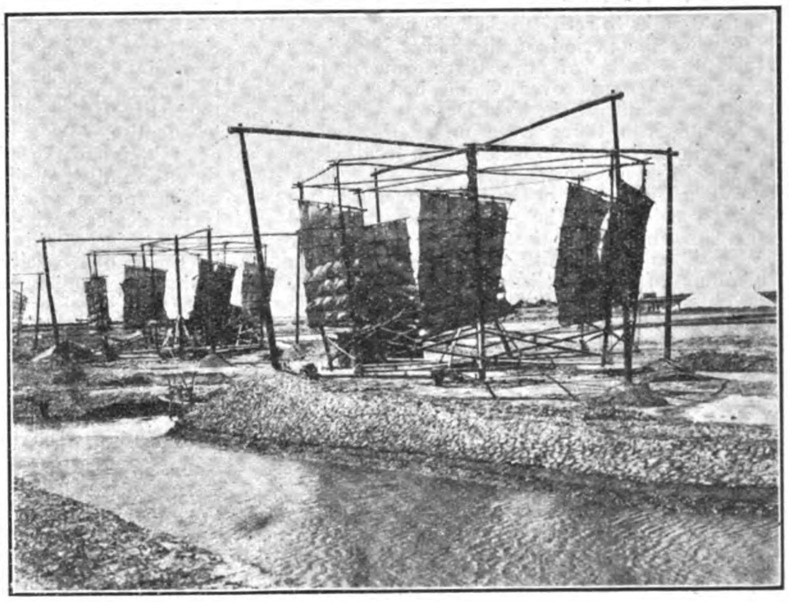
So much has been heard of, and so little is generally known about the Salt Gabelle which has figured so conspicuously in the recent loan discussions, that there seems justification for the publication at this stage of illustrative facts connected with this most interesting of China's industries and sources of taxation. In China the history of salt taxation may be said to represent the principal features in the history of political economy generally.

Taxation of salt commenced as far back as the seventh century B.C., and the earliest mention of the commodity as in the annals of the great Emperor Yu (B.C. 2205-2197) who once ordered the province of Chingchou, which corresponds to the present Shantung, to supply the Court with, among other things, salt. During the Chow dynasty (B.C. 1122-249) officers were appointed for the administration of salt matters, and the *yen jen*, or "salt men," are mentioned in a list of the Court officials during that period, though later times saw them degenerate from palace functionaries to butchers, tailors, and shoemakers.

The Kuan Chung, a celebrated statesman, who died B.C. 645, must go the credit for monopolising salt, though the word monopoly is somewhat inappropriate, since the Government does not engage directly in the manufacture of salt, and, except in Szechuan, does not concern itself immediately with its sale, but confines itself to a strict control of manufacture, transport, and sale. But from Kuan Chung's days it has been described as a Government monopoly, and he commenced taxation by levying upon the dealers an impost, being one, which he wisely enough reasoned, few consumers would escape. The monopoly thus introduced by Kuan Chung became the source of immense wealth collected in the little state of Chi, of which he was Prime Minister, and was the basis of a regular system of administration known as *yen-fa*, i.e., "the method of salt administration." There are no records to show that a similar system existed in other parts of the coast during the Chow dynasty, but it is on record that the revenue derived from the salt and iron monopolies had, during the Tsin Dynasty (B.C. 255 to 209), grown to about twenty times the amount gained during the Chow period.

There is reason to believe that the monopoly was abandoned during the reign of Kao-ti (B.C. 206-194), though it was reintroduced during the Han Dynasty, the revival being necessitated by the drain upon the treasury by the wars carried on by Emperor Wu-ti with the Hsiung-nu and other nations in Central Asia, and such costly expeditions as that of Chang Chien to the countries of the West. Two of the advisers of the great monarch developed the system, and among the penalties for boiling salt with implements and vessels belonging to the Government was one providing for the chaining of the culprit by the left foot and the confiscation of his vessels and implements. Salt inspectors were then created. Popular feeling did not, of course, exhibit itself in favour of a continuance of taxation of such a necessary commodity as salt, and when the wars had been forgotten agitation for remission of the salt and iron taxes developed and continued, though the Government remained deaf for a century to the complaints that the poorer classes had "to work their fields with wooden ploughs and use their hands in lieu of weeding hooks because of the tax on iron, and live upon unsalted meals." Ultimately Emperor Yuan-ti (B.C. 48-33) suspended the taxes for three years, but the salt tax again came into prominence under Ming-ti, of the Eastern Han Dynasty (A.D. 55-76). Popular disapproval again thrived and Emperor Ho-ti (A.D. 89-106) eventually suspended the taxes and they were not reintroduced until near the end of the





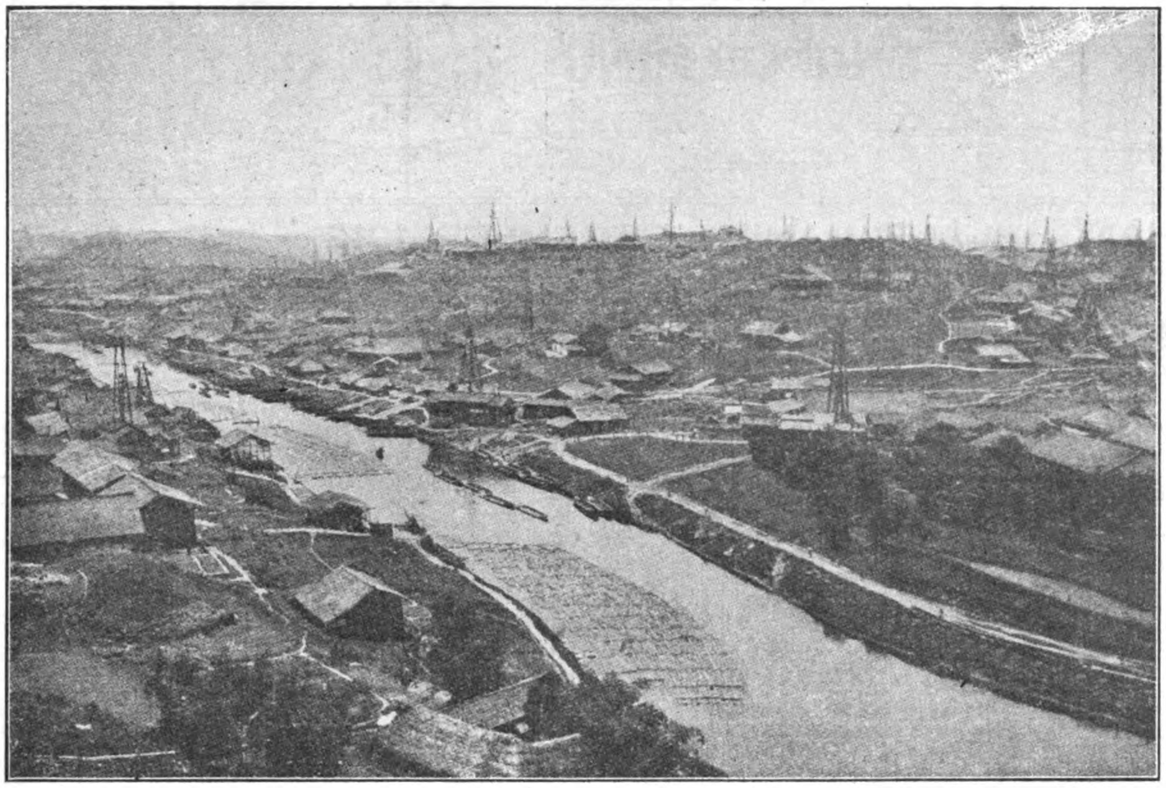
WIND MILLS USED IN SALT MANUFACTURING

NOTE:—THE equivalent of the HAIKWAN TAEL, in which the Customs Revenue and all values are stated, was, during the July-September quarter, 1912, at the average Sight Exchange on London, New York, Paris, Berlin, Calcutta, Japan, and Hongkong respectively, as follows:—

English Money, 3s. 0 9/16d.; American Money, $0.74; French Money *Francs* 3.84; German Money *Marks* 3.11; Indian Money *Rupees* 2·27; Japanese Money *Yen* 1·49; Mexican Dollars $1·51.

TABLE OF CHINESE WEIGHTS:—10 *Li* = 1 *Fen*, 10 *Fen* (CANDAREEN) = 1 *Ch'ien*, 10 *Ch'ien* (MACE) = 1 *Liang* = 583.3 grains (1⅓ oz. av.) 37.783 grammes. 16 *Liang* = 1 *Chin* 100 *Chin* (CATTY) = 1 *Tan* (PICUL) = 133⅓ lb, 60.453 kilogrammes.

Han Dynasty when in the Chien-an period (196-220) Commissioners were again introduced to control the sale of salt, on the plea that the proceeds were to be used to purchase buffaloes to be placed at the disposal of the people as an encouragement in agricultural labour with a view to induce emigrants and vagrant folks to retire to their homes.

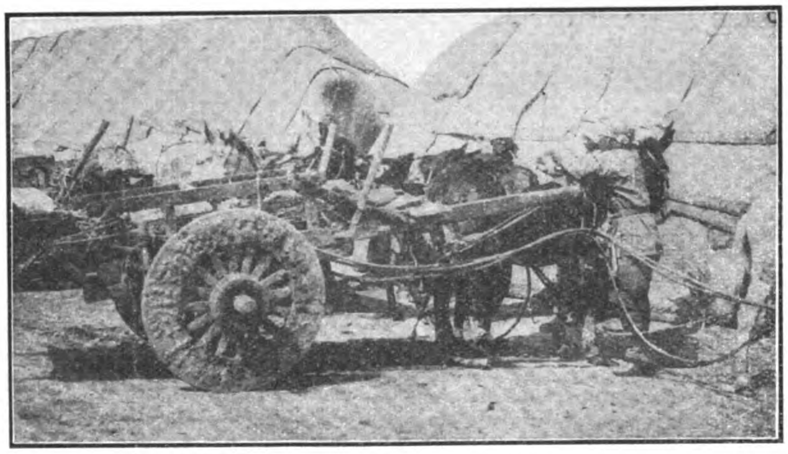


VIEW OF TZELING A SALT CENTRE OF SZECHUAN PROVINCE

During the period of the Three Kingdoms (220-618) each of the three governments dividing the rule over China had its own system, and during the Tsin Dynasty (265-420) salt and iron taxes were under the special control of a board of finances with local offices in the different principalities.

When China was again ruled over by two courts, a deficit in the public revenue caused the Government of the southern part under Wen-ti, in A D. 561, to levy a tax upon "boiling of sea-salt;" and after the empire had been re-united, we find under the year 583 the record of an edict which places the free use of the "salt marshes," and of the "salt springs" at the disposal of the people. It seems doubtful whether the sea coast participated in this privilege.

During the first century of the Tang dynasty the monopoly was not enforced with much strictness. At the beginning of the eighth century it appears that great portions of the lower order of the population were without occupation, and that evil results threatened from insufficient production on the one hand and the imminent growth of proletarianism on the other. This was apparently the state of the empire in 713 when one of the Emperor's advisers, Liu Tung, made the proposal that menials and agriculturalists without occupation should be employed in salt and iron works; and after this the collection of taxes upon the salt-marshes, of which there were eight, of the salt springs, of which there were 640, and of the salt works in Yu-chou, the country about Peking, and in Tatung, in Shensi, and Heng-yeh, was placed under the control of the To-chih, or Board of Finances. A further change was brought about during the period Chien-an (758-760) when the Salt and Iron Tax Commissioner, Ti-yiu Chi, proposed that out of the unsettled population those who occupied themselves with the manufacture of salt should be styled *t'ing-hu* (cottars?), who were to do labour in salt works kept on government account, and therefore to be exempted from all other socage. Moreover, on transporting salt from place to place in the interior it a transit tax of ten per cent. was to be levied on the market price. Liu Yen, the great scholar and financial operator of that period, who in his turn held the post of a Salt and Iron Commissioner, became the originator of a system similar to that existing up to the present day with regard to rice and grain, according to which salt was to be transported by government from the place of production to the consuming districts and there stored up in quantity. The tax levied upon the transport of salt from the place of manufacture to the more distant districts had the effect of raising prices at an unreasonable rate, and if the dealers, who it appears had speculated on the price of this indispensable commodity in times of scarcity, did not come forward with their supplies, or demanded unreasonable prices, the government would interfere by selling their stock at a standard rate which could not be increased however distant from the producing district a place might be, or however unfavourable the conjunctures of the trade had become. The salt thus held ready for the market by government was styled "salt at never changing prices." When Liu Yen took charge of the finances the annual net proceeds of the gabelle amounted to $400,000 but by 780 A.D. they had risen to $6,000,000, about one half of the entire revenue of the empire.



HEAPS OF PREPARED SALT

In A.D. 940, about the middle of the Five Dynasty period, salt was sold in small rolls called *t'san-yen*, from their likeness to cocoons, or in loose particles called *mo-yen*. In each salt district 170,000 strings worth were sold. A thousand cash weighed about six catties. Each householder might use in a year salt for which the duty was from a thousand to two hundred cash. Hawkers took the official salt to sell and this system was found to suit the Government and the people. The duty was levied on five different classes of consumers, those consuming salt taxable at either 200, 400, 600, 800, or 1,000 cash, and the amount was collected by the tax gatherer. Each knew how much he was to pay. This system was carried out by the Government for some time until it was discovered that a variation in the price of salt, determined by its proximity to or distance from the source of supply, compelled a reform which would prevent tax collectors obtaining more than a regular profit. A uniform duty of seven cash a catty was then levied on hawkers and ten cash on resident householders. The high authorities of each province and prefecture sent officers round to correct errors and redress grievances, but public dissatisfaction could not be avoided. To diminish this sense of wrong ten cash were subtracted from each *tow*, or a hundred from each picul.

The Lieu family gave place to the Ts'ai family, and the Emperor of this family fixed upon the title Kwang-shun in 951, and in the autumn of the same year issued an edict on salt. Death was the penalty for selling unrefined salt for any quantity beyond five catties or six and two-thirds English pounds. If the salt was refined, one catty and upwards sold rendered the seller liable to the death penalty. This rule was intended to be a step in the direction of leniency, for the preceding dynasty, which lasted only four years, had punished all sales of contraband salt with death, however small the quantity might be. In 953 dark coloured salt had been charged a duty of 800 cash a picul and every hundred was in full tale. Besides this the tribute in kind was ten pints. On white salt (dark salt, such as the sea salt used at Peking and Tientsin was much stronger than white, and therefore was charged higher duty) the duty was 500 cash a picul, and five pints of salt were required as tribute in kind. The new rule was to levy a duty of 1,000 cash on *t'sing* salt per picul with ten pints of the salt as tribute in kind. Still complaints were made, and the addition was objected to. It was settled that the good salt should be liable to a duty of 800 cash, and eighty-five were to count as a hundred, so that the actual payment was 680 cash a picul. Ten pints of salt were required. On the inferior white salt the duty exacted was 500 cash a picul and five pints in kind.

In A.D. 954 the late Chow Emperor, with the object of preventing smuggling, established a district of ten cities for the circulation of official salt (that in small cubes), the population on the west of Ts'au-chow-fu and the Sung region in Honan, including about ten cities, being supplied with cube salt. In 956, in November, it was made a law that north of the Chang river, in Chihli, in cities and markets as before, only official salt should be sold, but in villages salt was allowed to be sold on freetrade principles. Wherever salt and soda were mixed in the soil the people were allowed to carry it away to sell, but they were prohibited from trespassing upon those districts where official salt only was allowed to be sold.

Succeeding Emperors always found that salt was the most productive article of consumption to tax, and varied the systems according to their particular ideas of the method most likely to produce the best result with the least friction, though the populace continued periodically to voice their complaints and objections. Despite this, however, the market value of a certificate increased from 65,000 cash to 150,000 cash between the years 1296 and 1315.

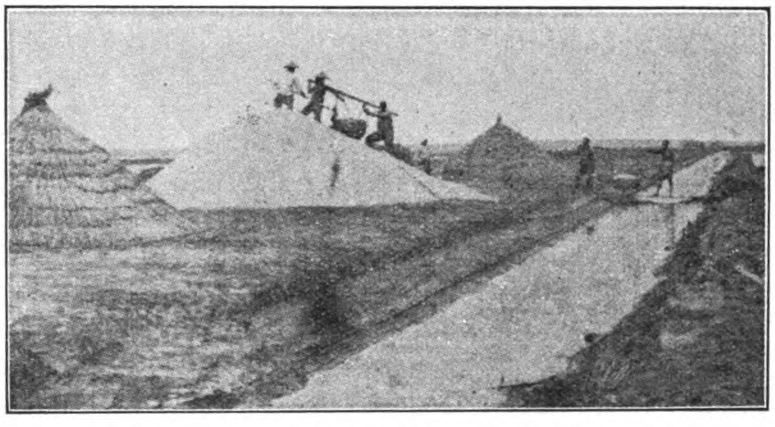
The Modern Administration

When we come to our own time we find the conditions similar in many respects to what they were one or two centuries ago. The collection of the tax differs in various provinces, but always it is veiled in more or less obscurity, or is portion of an intricate system of monopoly—mortgaging by firms or families whose forefathers originally secured the right to first farm the salt-tax collecting rights. This is one of the strong reasons advanced why the Salt Gabelle could never be reformed by foreigners or administered as is the maritime customs. We have it on the authority of the Commissioner of Customs at Hankow that there are some 42 different taxations under sundry government, charitable, and other names, imposed on salt before it can be brought to the consumer, in Hupeh province. The Commissioner of Customs at Yochow says that prior to the Taiping Rebellion the supplying of the districts in Hunan province which took Yueh salt was a monopoly in the hands of two rich Hunanese firms. The Taipings caused the complete collapse of the monopoly and it never revived. The next system was one of licensed salt shops, with *fan-shang*, or conveying merchants, who brought to them the salt from Kwangtung for retail sale to the people. The shops obtained their license from the Provincial Treasurer, its cost, including squeezes of all kinds to yamen underlings being about 400,000 cash (Taels 365).

In Shantung the Government farms the right to produce and manufacture salt to six resident firms who refarm it to contractors. The obligation of the resident firms is to supervise the contractors, make contracts, and collect taxes which they send to the Salt Controller.

In Manchuria it is open for anyone rich enough to buy a site to establish a salt pan. The payment of the price, which varies according to position, from Taels 100 to Taels 500, constitutes the site "property in perpetuity." The only taxes on salt in Manchuria are an annual tribute of 1 *tan* 5 *tou* per salt pan to the Imperial Household at Mukden and the tax of 7,200 *tiao* (about Taels 0.80) per tan (600 catties) on salt sold from the pans. There are in total about 3,600 salt pans along the coast of Fengtien, the low-lying flats which extend to the south of Yinkow for nearly 20 miles being one continuous field of salt-pans.

The province of Kwangsi is divided into salt administrative districts which constitute two monopolies. One, which has its centre at Wuchow, includes the Fu River Valley up to Kweilin and Chuan-chou, near the Hunan border, and is known as the Lin-chuan Fou; the other which with centre at Wuchow, takes in the West River up to Hsunchow and beyond, up the Liu River to Liuchow, and the district around Ching-yuan, is called the Ta-chiang Fu. The right to include the West River up to Nanning is contained in this latter monopoly, but is seldom availed of. Previous to the reign of the Emperor Hsien Feng the purveyance of salt to Kwangsi was farmed out in its entirety to monopolists, who were called simply *fou-shang*, on the principle of "conveyed to traders and disposed of by traders." The Taiping Rebellion, however, in that reign proved so disastrous to trade and to order that the monopolists were unable to pay the taxes due to the government, or provide the salt. A change was made, the government took over the charge of collecting the taxes, but farmed out the right to import the salt. The highest bidder presumably receives the monopoly, the terms of which are arranged with the Salt Commissioner for the Two Kwang in Canton. The monopolist is bound to import not less than 238,000 bags of salt a year and pay the taxes on the same, and of this for the Fu River districts Ta-ching Fu, the minimum is 120,000 bags; this quantity constitutes *kuan-yin*, or official permit salt. But the monopolist is of course permitted to import more salt, if he so requires, and for which he receives the usual permits—such extra quantities being called *kuo-ngo* or *ngo-wai*. In addition to the above there may happen to be, and it is generally to the monopolist's advantage that there should be, salt remaining unsold from year to year; such salt is called *chi-yin*, is subject to a reduced duty payment, is sold through a special hong, and in retail quantities. The quantities of *kuo-ngo* and *chi-yin* salt depends on many considerations, not the least of which is the success of the salt smugglers; the less smuggled salt there is the more legal salt is required and the more the monopolist benefits.



SALT FIELDS AT PITSUWO

With a view to presenting some adequate idea of the actual operation of the Government control of salt in widely separated provinces we include some facts about the operation in Szechuan province and the Hwai administration, the two largest sources of supply in the country, and the conditions described in the Hwai Administration are prevalent in all.

The Szechuan System

The now famous salt wells of Szechuan were not discovered until somewhere about A.D. 249, or at least records contain no mention of them before that date. In that year a well was opened in the south of the present Cheng-tu district, the opening being ascribed to Governor Li Ping who seems to have done more than anyone else to develop the resources of the province, and to this day he is worshipped as its special patron saint. The Government made a monopoly of the evaporating pans and ovens, and a law forbade the clandestine manufacture of salt, the penalty being the confiscation of the implements used besides the cutting off of the big toe of every offender. The pans and ovens were rented out to those desirous of manufacturing in return for a proportion of the yield, which was the original and earliest form of well tax.

In the T'ang dynasty the monopoly of pans and ovens was given up—manufacturers providing these for themselves—but a well-tax was levied instead, which was regulated by the annual output. The wells then numbered 641, and the manufactured article was allowed free circulation. Early in the Sung dynasty a special high officer was created for the administration of the tea and salt trades, and in 1001 the province was first divided into four circuits each under a superintendent of trade, which, being collectively known as Ssu-ch'uan-lu, gave the province its present name. During this time the term *yin*, meaning a permit or pass, was first used in connection with the salt industry, and has been conspicuous in all subsequent codes of regulations. In 992, during the war on the northern frontiers supplies for the army were paid for in *yin* for surplus salt from the great salt districts in the Eastern provinces. This irregular system soon became an approved system of taxation and as such it was introduced in Szechuan in 1132. Two taxes on the one article came into operation at the one time—one on the wells, the other on the purchaser.

The system continued through the Yuan dynasty, and during the Ming dynasty the control became much stricter and a complicated official apparatus was created for the purpose. After the accession of the Manchu dynasty the supreme control of the gabelle was vested in the Government.

In 1877 what is known as the Government transport system was introduced, the principle upon which it is based being that while leaving the production and ultimate production to private enterprise the government, in order to insure the distribution in every direction, undertook the conveyance. It purchased the salt at the wells, transported it to destination, or to central depots, and there sold it to the trade at a figure which included all charges for prime cost transport, duty, etc. Permission was first granted to give the system a trial at Kweichou and, on its being found entirely successful, it was extended to Yunnan, to the eight districts of Hupeh drawing salt from Szechuan and to 33 districts of the province itself.

There were actually three different systems working side by side in Szechuan province alone, and methods differed in other provinces. One was the allotment system, another was the incorporation of the salt tax in the poll tax, and the third the government transport system above referred to. This, if honestly carried out, was calculated to satisfy best the requirements of both the revenue and the public. It approaches to a certain extent the idea of a salt monopoly, but is not inasmuch as the Government occupies itself nowise with either the manufacture or ultimate sale of the product. In 1882 there were 40 districts in Szechuan producing salt in greater or less quantity. The salt-wells numbered 8,830, the "fire-wells" (described at a later stage) 10; the ovens 1,484; the evaporating pans 5,527; and the "hot water" pans 238. The regular supply for which permits were issued and the distribution of which was regulated by definite rules was nominally piculs 2,061,816, actually piculs 2,371,088 and more. This is called *yin yen*, in contradistinction to the *yu yen*, or surplus salt, which is subject only to likin charges en route to distribution.

For the regular supply of salt the permits are issued by the Board of Revenue and

transmitted to the Governor-General as the responsible head of the Salt Administration. The permits are distinguished as regular permits and reserve permits. The latter to the number of 5,000 are retained by the Governor-General as a reserve stock to be drawn on in the event of any district applying for an increased allotment. In Szechuan 104 out of the 137 districts are under the control, for salt tax purposes, of the Salt Commissioner. The system of administration is mainly the same as inaugurated in 1732. In 42 districts, however, mostly in the north of the province the salt tax is collected simultaneously with the poll tax now amalgamated with the land tax. The permits are retained by the Salt Commissioner and the districts concerned depend for their supply on the surplus salt purchasable in small quantities at the nearest salt wells. In the remaining 62 districts the permits are handed to the territorial officials according to fixed allotment and these act as collectors of the salt tax. They again distribute them among a number of resident firms who have obtained the privilege against heavy guarantees. And in their turn these merchants invite other companies to contract for the conveyance of the produce to destination. On arrival there a statement of original cost, transport expenses, etc., is submitted to the magistrate who proceeds to collect the charges due, and, adding 4 cash per catty for the merchants' profit, fixes the price of salt accordingly by proclamation. At the end of the year the permits, together with the dues collected, are supposed to be surrendered to the Salt Commissioner who forwards them to the provincial capital with his return. The permits are eventually returned to Peking and the revenue is either remitted or otherwise accounted for.

The head office of the Government Salt Transport is at Lu-chou and is under the direction of a general manager. Branch offices are established at various places where salt is stored pending shipment. From the branch offices it is transported to the depots at destination and sold to the trader. The permits which have accompanied the produce thus far are returned to the head office and *hu-chao* issued to protect the goods to their ultimate places of consumption.

The surplus salt of those districts which contribute to the regular supply taxed by the officials established in the districts, and after being freed, may be conveyed to any market subject only to likin duty en route, but no applicant is granted a pass for more than 80 catties at one time.

The actual heads under which taxation is levied in Szechuan are:

(*a*) *Well Tax.* The productivity of a well is assessed after it has been working three years, and graded into first, second, or third class. There is no fixed scale of taxation, but once assessed the tax remains the same year after year.

(*b*) *Regular Salt Tax,* calculated on the old basis of Taels 0.0681 per picul, or Taels 3.405 per River Permit and Taels 0.2724 per Land permit.

(*c*) *Remittance Tax,* providing for expenditure connected with the printing of the permits and their remittance every year from and to the Board of Revenue in Peking. Three mace are charged per 100 permits for the cost of printing and 4 *li* per permit for cost of remittance.

(*d*) *Examination fee,* intended, originally for barrier expenses. It amounts to 6 mace per river and 48 *li* per land permit, if for Szechuan or Hupei, and to one tael per river and 80 *li* per land permit, if for Yunnan or Kweichow.

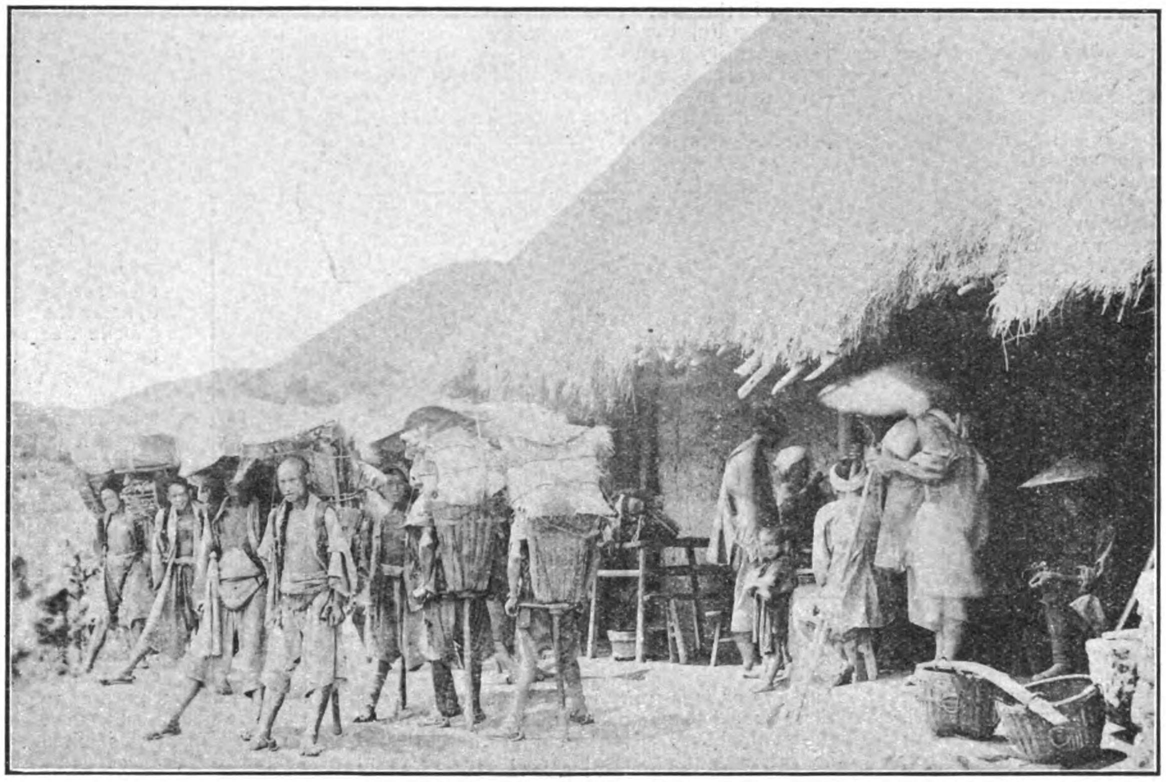
(*e*) *Overcharge,* for cost of administration. This is collected both on the well tax and on the salt tax proper. It varies in different districts but remains the same from year to year.

The taxes (*a*) to (*c*) represent the original salt revenue due to the Central Government, (*d*) and (*e*) were formerly illegal charges, the amounts of which varied in different places, but have since been submitted to the Board and approved of. All have now become fixed assessments, (*a*) to (*c*) being annually remitted to Peking, (*d*) and (*e*) retained in the province, but reported and accounted for.

It is contended that the salt tax from the whole revenue of Szechuan may be estimated at Taels 2,000,000. Apart from the remittances for Peking it is mainly appropriated for the maintanance of the military, for subsidies to the administrations of Yunnan and Kweichow, which are not yet self-supporting, and in later years also for contributions to the coast defence.

The Hwai Administration.

The Hwai Administration, supplies about 100,000,000 of the population, and is perhaps the most important of the Salt areas into which the country was divided. The Governor-General at Nanking is the direct head, and under him is an army of controllers, agents, guards, etc., echelonned along and on both sides of the Yangtsze, charged with control of the traffic, prevention of smuggling and levy of taxes. Production, transport, and sale are in private hands, under licenses issued by the Administration. From the vats to the depots (the principal one being above and opposite Chinkiang) the salt is practically in bond. At the depot the salt is bought, at a price fixed by the Administration, by the holders of licenses; of these a fixed number, usually 300 to 400 to each province, have been issued against a capital payment which, if there were a demand for further issue now, would be Taels 10,000 to Taels 12,000 each. The licensees take their turn, which may be once in two years or twice in three years according to circumstances, and in his turn each is permitted to buy 3,750 piculs of salt.



SALT CARRIERS AT A LIKIN STATION, IN KWEICHOW PROVINCE

In order to evade the difficulties caused by different regulations and customs on every route, different weights at short distances, and different taxes in different provinces, it is necessary to select one province, and Hupeh will be assumed to be the destination. The cost of production is Taels 1,130 for this quantity in which is included the vat licence fee and transport to the depot; and the price paid at the depot is Taels 3,725, giving Taels 2,595 for Government charges for storage, and taxation to this point. The transport to Hupeh is controlled from point to point and on arrival the salt is stored in one of the provincial depots, paying storage and awaiting its turn to be sold to the licensed shops, conveyance to which is also controlled. There are numerous changes of scale, changes in the method of accounting, delays to be avoided and difficulties to be smoothed away, which add to the cost of the salt, and to the emoluments of the Administration agents, and contribute nothing to the revenue but which must all be paid for by the Customs; and merely to enumerate the different items of taxation and adequately describe the

application of an exceedingly complicated system would require a chapter to itself. It is sufficient to say that the regular officially recognised taxation from the depot near Chinkiang to issue from the provincial depot at Hankow is put by good authority at Taels 1.60, and a little more per picul. To get at what the people pay we need only take the retail price which is fixed by the Salt Administration. In Hupeh about 1898 the average retail price so fixed was fifty cash per catty; as the corresponding price in Hunan was fifty-six cash, and as those were the prices before the increase in taxation to meet the Boxer indemnities; this price of fifty cash may be accepted as a fair average. Converting at the same rates, the producers cost of Taels 1,130 for the quantity of 3,750 piculs, under one license, is increased to Taels 12,545, as the price to the consumer, the difference being Taels 11,415; if Taels 1,415 be allowed for cost of transport and legitimate profit the remaining Taels 10,000, (Taels 2.67 a picul) is paid by the people as tax regular or irregular, open or covert.

Under the recent regime the country was divided, for productive, administrative, and descriptive purposes, into eleven salt areas, the salt from one not being permitted entry to another. On the receipt of licenses the farmers are required to give a bond that the salt shall be sold only in the district named by the Government; non-observance of this rule entails prosecution and confiscation of their stock of salt. At the same time the fixed rate is given them at which they are to conduct the sales. These rates are not the same everywhere, but lower for the districts in the neighbourhood of the salt works, and higher in proportion as the distance from them increases.

The monopoly was thus conducted and controlled for a considerable period, The areas were:

1.—Shengking: sea salt, supplying Manchuria.

2.—Chang-lu (Long Reed): sea salt, supplying Chihli and the northern part of Honan.

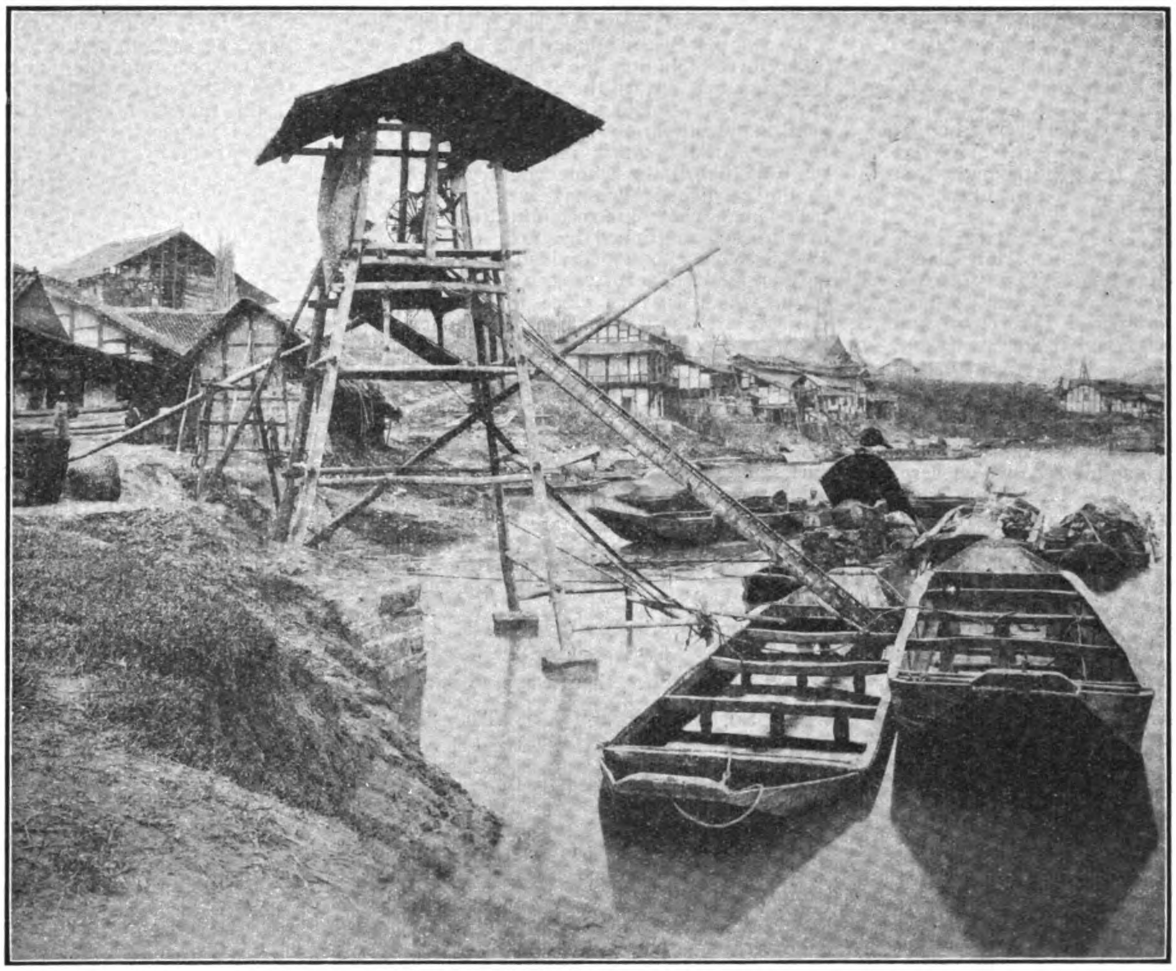
3.—Ho-tung ("East of the Yellow River"): lake salt, supplying Shansi, the western part of Honan, and the south-eastern part of Shensi.

4.—Hwa-ma-chih ("Piebald Horse pool"): lake salt supplying Mongolia, Kansu, and the greater part of Shensi.

5.—Shantung: sea salt supplying Shantung and corners of Honan, Anhwei, and Kiangsu.

6.—Hwai: sea salt, for administrative and distributive purposes divided into:

6a.—Northern Hwai, supplying the northern part of Kiangse north of the Yangtsze, the northern part of Anhwei, and the southern part of Honan.



PUMPING BRINE FROM LIGHTERS AT FUCHOW, SZECHUAN

6b.—Southern Hwai, supplying the southern part of Kiangsu north of the Yangtsze and Nanking south of the Yangtsze, the southern part of Anhwei, the northern part of Kiangsu, the eastern part of Hupeh, and the greater part of Hunan.

7.—Szechuan: well salt, supplying Szechuan, the north east corner of Yunnan, nearly all of Kweichow, a corner of Hunan, and the western part of Hupeh.

8.—Yunnan: well salt, supplying all Yunnan except the north-east and south-east corners.

9.—Chekiang: sea salt, supplying Chekiang, Kiangsu south of the Yangtze (except Nanking), and corner of Anhwei and Kiangsu.

10.—Fukien: sea salt supplying Fukien except the south-west corner.

11.—Kwangtung: sea salt, supplying Kwangtung, Kwangsi, the northern part of Kwangsi, and small corners of Fukien, Hunan, Kweichow, and Yunnan. A twelfth, self-supplying and consuming, area of small dimensions in central Hupeh need not be considered.

During the tenure of office of Duke Tsai-tze as Minister of Finance before the abdication of the Manchu Dynasty these eleven districts were consolidated into eight, namely: Manchuria; Changlu, including part of Honan, with headquarters at Tientsin; Shantung; the two Hwai, with headquarters at Nanking; the two Che, with headquarters at Chekiang; Fukien; the two Kwang; and Szechuan.

Revenue Derived from the Gabelle

A statement of the utmost interest as to the revenue derivable from the Salt Gabelle was prepared in July 1912, and published for private circulation by Messrs. Masnoske Odagiri and Kokichi Midzuno, the former being the Japanese representative in the Six Power Banking Group, and the latter being the First Secretary of the Japanese Legation at Peking. They point out that in the early ages of the Manchu Dynasty, reports on revenue from the Provinces to the Central Government, only showed the net income to the Central Government, and the expense of collection, which amounted usually to about ten per cent. (in some localities up to twenty per cent.) was not reported. This expense of collection the provincial authorities were allowed to levy on the people, in addition to the ordinary taxes and other impositions. Thus figures quoted from the Ta Ch'ing Hui Tien based on provincial reports naturally show the net income of the Central Government, expenses of collection having been previously deducted by the local authorities. Since the Taiping rebellion administrative

expenses of the provincial goverments have enormously increased and the Viceroys and Governors have, with the sanction of the Central Government, imposed new likin and contributions and used them for provincial administration, reporting or without reporting them to the Central Government. When the new state of affairs necessitated the compilation of a budget on modern lines a thorough investigation of provincial impositions of every description, as well as the aforesaid expense of collection, was made by the officials sent out by the Central Government for that purpose. The Central Government, compiled the budget for the third year of Hsuan-tung, 1911, based on reports of those officials. Hence the sudden and enormous swelling of the budget. The budget for 1911 when first published was not free from some ambiguity, for instance: in the revenue, salt and tea taxes were not separated, and they figured at Taels 47,000,000, but the gross profits of the Government transportation service was not included. In the expenditure, expenses of collection of salt and tea taxes were not separated, but were put down together with the expense of collection of other revenues. But a later revision added some Taels 6,000,000 for the Government transportation service, and separated the Taels 2,000,000 derived from the tea tax and placed the working expenses of the salt gabelle at Taels 8,000,000. The budget for 1912 shows some improvement, having set apart the Salt Gabelle revenue from the tea tax and detailed the items of expenditure of all the officers of the Gabelle.

Most, or rather all, of the Occidental authorities on the Salt revenue have invariably placed the total net revenue at about Taels 13,000,000. There having been no other available figures than reports of provincial Viceroys and Governors their calculations are apparently and necessarily based thereon. The budget for 1912 is most reliable for practical purposes.

Increase of Salt Likin and Surtaxes—The only reliable figures available about Salt Likin in the early Kuang-su era are those of the thirteenth year of Kuang-su (1887) which were, according to the Ta Ch'ing Hui Tien, Taels 4,001,747 and 2,417,980 strings of copper cash. When these figures are compared with those of the current year (1912) i.e., Taels 9,019,352, a very significant increase is noticeable.

Although surtaxes such as those of Chang-lu (Chihli) and Shantung for works of the Grand Canal, repairs of the Yellow River, etc., were not infrequent, even prior to the Kuang-su era, yet such advances, so far as records go, were not very remarkable. After the accession to the Throne of the Emperor Kuang-su, especially since the Boxer trouble, increases in surtax have become frequent and enormous. The following joint memorial, dated the 23rd day of the seventh moon, of the third year of Hsuan-tung (1911) of the Central Salt Gabelle Office, and the Department of Finance, speaks for itself. "Troubles since the early years of Kuang-su have necessitated advances in the surtax to save the country from calamity, viz: surtax for rations and salary, (Army); surtax for drill, (Army); surtax for River Defence, Yangtsze, (Navy); surtax for coast defence, (Peiyang Squadron); surtax for new indemnity, (Boxer trouble); surtax to supplement opium duties, dues, etc., (four cash per catty since the year 34th Kuang-su, 1908, to supplement deficit of opium revenue); surtax for Yao Cheng K'ou Chen, (new administration); surtax for building war vessels (two cash per catty in Hupeh since the sixth moon of 34th year of Kuang-su, 1908); surtax for railways, Hunan, Honan, Chihli, etc., (four cash per catty in Honan since the first year of Hsuang T'ung, (1908) in Chihli, the sixth moon of the same year.) Some of these surtaxes were made universal all over the country by the Department of Finance, others were imposed by provincial manifestoes. The more the necessity the more pretexts and newer ways and means of levying, and the surtaxes have advanced invariably in all provinces until in some provinces they reach twenty cash per catty. This state of affairs is from a financial point of view an inequality and from the people's standpoint an uneven burden. In Hunan the surtax was increased ten times since the tenth year of Kuang-su (1884), which amounted to 26 cash per catty." The foregoing Memorial shows how frequent and radical the increases of surtaxes have been in recent years.

According to the Memorial of the Department of Finance of the fifth moon of the 34th year of Kuang-su (1908) an increase of surtax by four cash per catty would realise an additional revenue of four to five million taels. One cash per catty, therefore, means, roughly speaking, Taels 1,000,000 to Taels 1,250,000 to the Fiscus.

The *Official Gazette*, dated the 6th day of the 12th moon of the 34th year of Kuang-su (1909), throws a side-light on these figures when it publishes a memorial by the Viceroy of Chihli, in which he states that the proposed increase of surtax four cash per catty of Chang-lu salt (Chihli province), shall be contracted at one tael two mace per *yin* (license, which in the case at Chang-lu, covers about 600 catties, whereas the average throughout China Proper is about 540, and means therefore one tael eight candareens per *yin*). The total issue of *yin* in the seventeenth year of Kuang-su (1891), is, according to the Ta Ching Hui Tien, 4,180,000 pieces per annum in China Proper. Therefore, including the consumption of salt in Manchuria, etc., to the aforesaid figures for China Proper (making an addition of ten per cent. in consideration of the fact that the salt revenue of Manchuria represents about one-tenth of that of the whole country, according to the published budgets) we arrive at the following figures: 4,180,000, plus 418,000, a total of 4,598,000 multiplied by 1.08, equals Taels 4,965,840,000, 4,965,840 divided by four shows an increase of Taels 1,240,000 at one cash per catty, which is very close to the aforesaid estimate of the Department of Finance. If the increase of Salt Surtax in the whole country since the first year of Kuang-su can be estimated at fifteen cash per catty the total increase thereby of revenue will be approximately Taels 18,000,000. This proves that the Budget for 1912, which estimates an increase of surtax of Taels 17,317,000, is not far from being accurate.

The following amounts are those representing the receipts by the Central Government at various periods from 1753:

	Year		*Fiscal Income*
Ch'ien Lung,	18th year (1753)	Tls.	7,014,941
Chia Ch'ing,	5th „ (1800)	„	8,081,517

In these old times, there was no Likin.

Kuang Su,	15th year (1889)	Tls.	7,716,272
do.	17th „ (1891)	„	7,398,799

(NOTE:—According to the Ta Ch'ing Hui Tien, grand total of provincial Salt Likin of the 13th year of Kuang Su, 1887, is Tls. 4,001,747 and Strings of Copper Cash 2,417,980).

Kuang Su,	19th year (1893)	Tls.	7,679,828

(NOTE:—The three foregoing figures do not include the income from Likin).

Kuang Su,	20th year (1894)	Tls.	13,000,000
do.	23rd „ (1897)	„	13,659,000
do.	24th „ (1898)	„	12,600,000
do.	29th „ (1903)	„	11,269,865
and Strings of Copper Cash			2,240,044
Kuang Su,	32nd year (1906)	Tls.	12,951,000

(NOTE:—The five foregoing figures include the income from Likin).

Hsuan T'ung,	3rd year of 13 months (1911)	Tls,	51,903,780
do.	4th year (1912)	„	47,575,486

From the above table it will be seen that the Budget for 1912 shows an increase of 600% compared with the time when there was no Likin, and about 350% over even that of 20 years ago, which included Likin.

Increase of the Salt Gabelle Revenue in three Eastern Provinces:—Of all the provinces of China the Three Eastern Provinces are most conspicious in the increase of salt revenue. According to the Ta Ching Hui Tien in the 13th year of Kuang-su (1887), the income of Salt Likin of Fengtien province was only Tls. 210,000, while recent returns show that the total Salt Likin, etc., of that province amount to Tls. 1,600,000.

As to the Government Transportation Service, etc., of salt in Kirin and Heilungkiang, the Ta Ching Hui Tien does not show any income in that category, but according to the latest budget, these two provinces pay to the Fiscus about Tls, 2,800,000 as the income of the Government Transportation Service of Salt, etc.

These are only two of the many instances of very extensive and radical increase of revenue on salt, made possible by the improvements on and progress of the three Provinces in the past twenty years.

Increase of Revenue by Reorganization.—It cannot be denied that the Salt Gabelle revenue will be materially increased if the whole system be reorganized, and smuggling and unauthorized manufacturing of salt be suppressed, and the prevailing corruption could be done away.

Mr. Hsiung Hsi Ling, ex-Minister of Finance, estimates China's population at 420,000,000 and at 13 catties per capita annually, he calculates the annual consumption of salt at 54,600,000 piculs, the total income of the Salt Gabelle being $109,000,000 at $2 per picul.

As these figures are apparently doubtful, it may be safe to figure China's population at 250,000,000, and the annual consumption of salt at 32,500,000 piculs.

So far as Messrs. Odagiri and Midzuno could gather, the capita per annual consumption of salt by different nations is:

about	50	catties	United Kingdom.
„	37	„	Germany.
„	37	„	France.
„	27	„	Austria.
„	24	„	Corea.
„	21	„	Russia.
„	20	„	Japan.
„	18	„	Hungary.
„	14	„	Formosa.
„	13	„	Spain.
„	11	„	Italy.

When it is considered that 90% of the Formosan population (except aborigines) are of Chinese origin, and that they still adhere to their old modes of life, and in fact are more conservative than most of the citizens of the new Republic, then Mr. Hsiung's "13 catties per capita" may be accepted as justifiable.

Under the present circumstances there seems no necessity to reduce the current rate of taxes and other impositions. Mr. Hsiung proposes to continue to tax two taels five mace per picul of salt. This was based apparently on General Teh Liang's Memorial to the Throne, made eight years ago. It is true that the Kiangning Salt Gabelle Office is imposing Tls. 2.50 per picul all told, but at some other places less than Tls. 2.50 is imposed on a picul.

It is, therefore, safe to say that Tls. 2.25 per picul can be borne by the people without any difficulty.

That will mean a gross income of about Tls. 73,000,000 on the reorganized Salt Gabelle, i.e., more then twenty-five million taels over the gross revenue in the budget for 1912.

What the increase of revenue would be, if Mr. Hsiung's plan of reorganization were to be carried out, or if the proposed reorganization under foreign administration were adopted, Messrs. Odagiri and Midzano are not prepared to venture to forcast.

INCOME AND EXPENDITURE.

How much the provinces contribute towards the Salt Gabelle can be seen from the following table of the Budget for 1912 prepared by the Department of Finanee:—

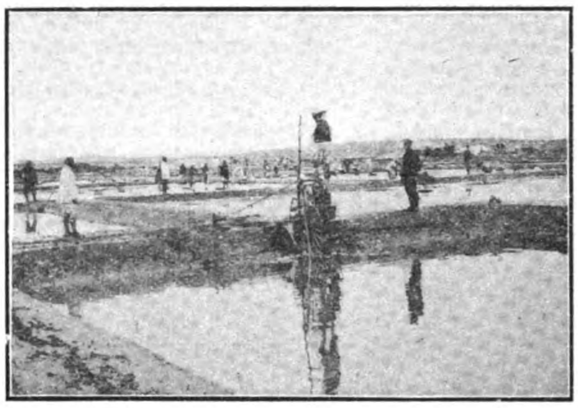
Province Revenue	in Kuping Taels
Fengtien	1,655,694
Kirin	1,865,766
Heilungkiang	1,013,735
Chihli	5,236,818
Kiang-ning (Nanking)	3,968,269
Kiangsu (Soochow)	16,439
Anhui	....
Kiangpeh	29,982
Shantung	1,725,662
Shansi	1,346,162
Honan	296,322
Shensi	441,322

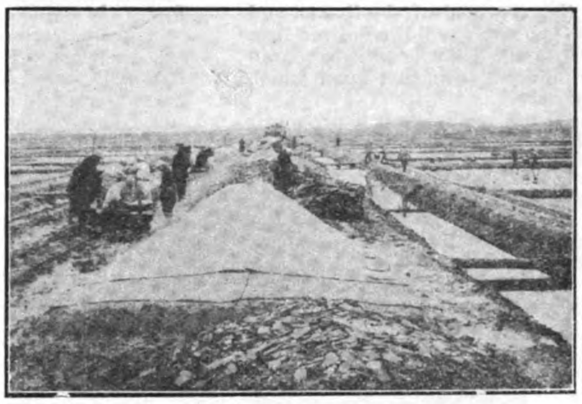
Province Revenue	in Kuping Taels
Kansu	167,518
New Dominion	19,618
Fukien	1,088,213
Chekiang	2,406,329
Kiangsi	72,120
Hupeh	1,768,584
Hunan	251,925
Szechuan	6,721,993
Kwangtung	5,486,962
Kwangsi	567,528
Yunnan	1,337,500
Kweichow	13,640
Jehol	63,335
Chahar	8,050
Szechuan Yunnan Boundaries	6,000
Ili	....
Total	47,575,486

In addition to the above the Budget has an item of Salt Contribution amounting to	8,607
Expenditure	
Ordinary	
Central Salt Gabelle Office	179,274
Provincial Salt Gabelle Yamens and detached offices	3,897,741
Provincial Salt Transportation Service	3,283,026
Extraordinary Expenditure	
Provincial Salt Yamens and detached offices	133,654
Provincial Salt Transportation Service	7,202
Total	140,856
Grand Total	7,500,897

It is understood that Tls. 500,000 of the Salt Revenue is secured for a Chihli bond and Tls. 100,000 for a Hupeh bond. There are doubtless, a few more small provincial loans for which the Salt Gabelle is mortgaged, However, the total amount of revenue mortgaged for these bonds and loans will not be very large, say, not more than one million taels. This much added to the aforesaid total, the grand total of the Salt Gabelle Revenue already mortgaged for China's indebtedness will be Tls. 27,840,070.

Since the above was compiled by Messrs. Odagiri and Midzuno the Crisp Loan of 1912 for £10,000,000 was secured upon the revenues of the Gabelle. There are also the Six Group advances of 1912 of £12,660,000 and the Currency Loan of 1911 of £10,000,000.





A TYPICAL CHINESE COASTAL SALT MARSH AND EVAPORATING BED

The following list which appears in the Budget for 1912 prepared by the Department of Finance shows the items of the present Salt Gabelle revenue and expenditure:—

Revenue

Ordinary Revenue	in Kuping Taels
Salt Land Tax and Oven Tax	262,056
Regular Tax	7,699,526
Likins	9,019,352
Surtax	17,317,578
Miscellaneous contributions, etc.	2,239,245
Gross profits of Government Transportation Service	5,462,278
License for free manufacture and sale of salt, etc.	2,440,104
Miscellaneous items	3,079,796
Total	47,519,935
Extraordinary Revenue	
Tax and Likins	21,527
Miscellaneous contributions	240
Gross profits of Government Transportation Service	31,734
Miscellaneous items	2,050
Total	55,551
Grand Total	45,575,486

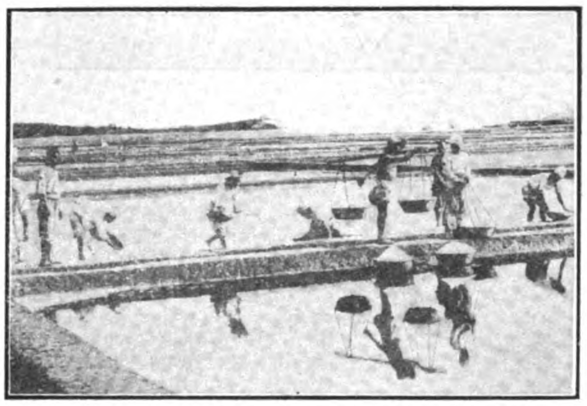
SALT GABELLE AND FOREIGN LOANS

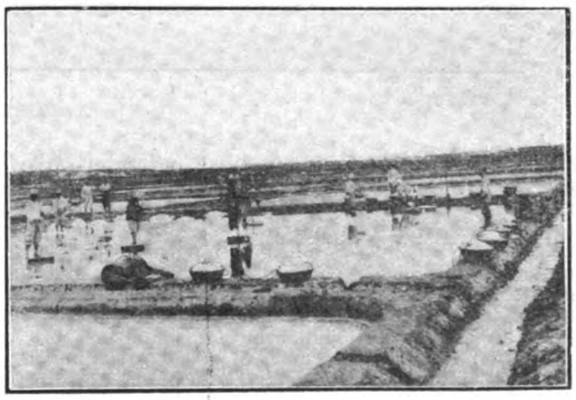
The revenue of the Salt Gabelle mortgaged for foreign loans is as follows:

Year	*Loan Secured.*	*Salt Revenue Mortgaged*
1898	Anglo-German Loan of £16,000,000 (besides Custom revenue)	Tls. 1,800,000
1901	Boxer Indemnity (for convenience sake take 1912 figure £3,000,000)	20,000,000
1908	Anglo-French Peking-Hankow Railway Loan of £5.000,000 (besides other securities)	2,350,000
1911	Hukuang Railway Loan of £6,000,000 (besides other securities)	950,000
1911	Liang Kiang Silver Loan of Tls. 3,000.000	40,000
1911	Hupeh Silver Loan of Tls. 2,000,000 Ichang Salt Likin	1,000,000
	Total Tls.	26,840,000

PROPOSED REFORM OF THE GABELLE

The prolonged discussion that has centered round the Salt Gabelle was evoked by the proposal that the Gabelle should be reformed under foreign supervision and be pledged as the security for the large reorganisation loan which China desired to obtain from the Six Power Banking Group. The Group deemed it expedient and necessary to supervise the expenditure of any further large loan, owing to the unsettled state of the country and the chaotic condition of the finances, and although no definite programme of reform of the Salt Gabelle had ever been laid before the Chinese Government by the Group it was stated in general terms that control something on the lines of the Maritime Customs was desired in the interests of bondholders. The Maritime Customs revenues are so controlled that they remained intact despite the Revolution and the desperate straits in which the finances of the Revolutionists and Manchus were placed. Both sides were ready to make any sacrifice for money to carry on their respective campaigns, but the revenues collected from their own country's trade were fortunately preserved and withheld from their reach. Thus, and thus only, was China's credit upheld during the recent 'Revolution. It is





COLLECTING SALT FROM THE BEDS

certain that had the Customs revenues been available to the respective sides during the revolution the country would have been bankrupt to-day. The Group, in considering the advancement of further large amounts to China, felt that it would be disastrous to make loans without some tangible security that could be made assignable in the event of default on the part of the Government, or could be maintained under foreign control in the event of another crisis like the recent revolution. On the plea that China's sovereign rights were being infringed even by the suggestion to have the Salt Gabelle supervised by Europeans, the people and the Government—or rather a section of both—stoutly opposed the proposal, and thus the loan deadlock has been prolonged until this writing, though a compromise is now thought possible. The Group is said to have agreed to the Chinese themselves reforming the Gabelle under foreigners engaged by the Chinese, with the approval of the Group, and it is likely that not only will the desired loan be made but that the Gabelle will be placed upon a footing different from that upon which it has ever been before.

The Chinese themselves have made proposals for reform, the Government's scheme being that the Government will buy all salt produced from the holders of leases of salt-lands and re-sell it to merchants after adding the tax of $2 per picul, thereby facilitating the collection of the tax and preventing dishonest collusion between the producer and the merchant. A year or two hence the Government will resume possession of the salt-lands of the interior and establish up-to-date factories throughout the coastal provinces, at which salt-bricks will be manufactured according to the Dutch system.

Mr, Chang Chien, who has devoted much of his time to the study of the Salt Gabelle also compiled a book on the necessary reform of the salt affairs of the whole country, but the Union of the Salt merchants thought that most of the contents of the book were impracticable, and submitted to the President a petition containing 55 articles suggesting the inadvisability of carrying them into effect. After perusal, the petition together with the book was forwarded to the Ministry of Finance for consideration.

In all probability the Government will seriously investigate the condition of salt control and revenue collection, and with the aid of foreigners will not only augment the returns to the state but will at the same time lighten the burdens now being borne by the people.

The Manufacture of Salt in China.

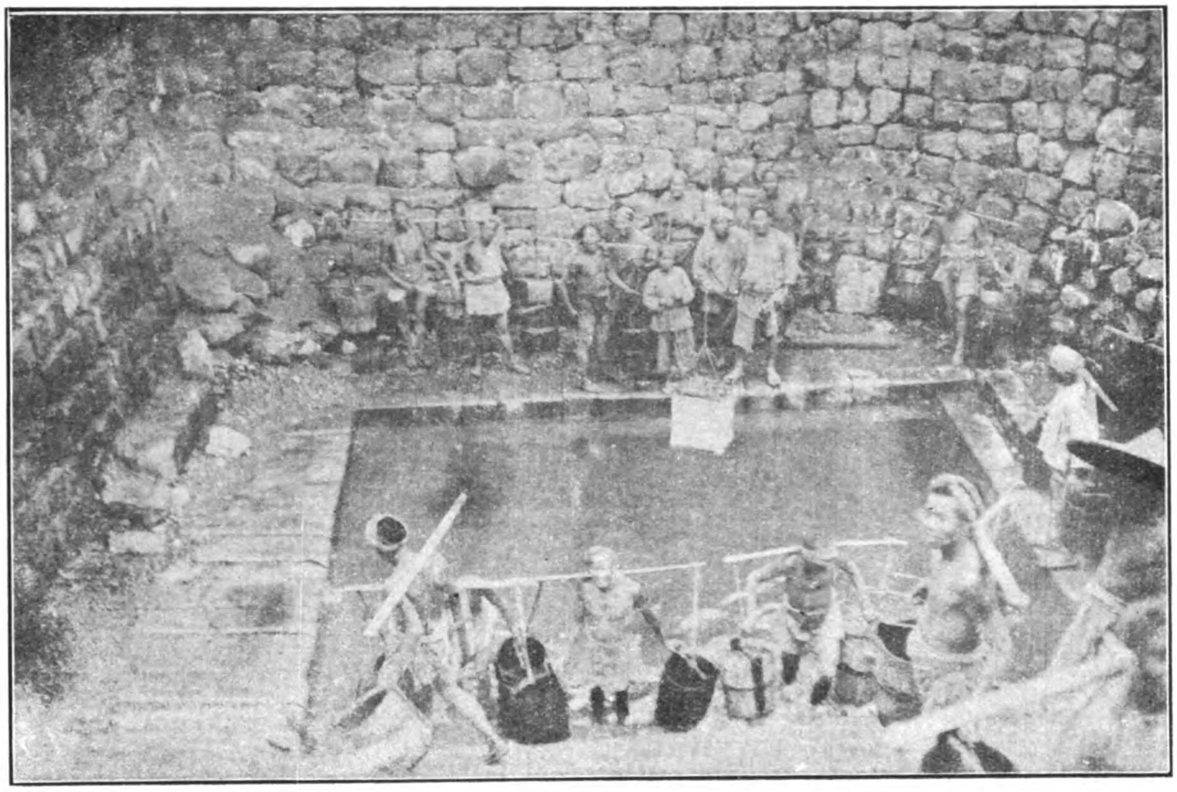
From time immemorial the production of salt has formed a subject of especial care to the Chinese Government, and here it is necessary to remark that in the remotest periods the salt trade was in China as highly esteemed as agriculture. Annually, at the opening of the salt-works, princes were present in person, and took an active interest in the first salt boilings; it cannot, therefore, be surprising that with such attention and encouragement on the part of princes, the salt trade rapidly assumed large proportions and became an important source of revenue to the State. In olden times in China salt was principally obtained by boiling sea-water; later on, however. i.e. under the Tang dynasty (620 A.D.), people began to extract salt from the water of inland seas by evaporation in the sun. The operation was extremely simple. The earth on the banks of the lake was dug out, reservoirs were made there for water and the water was conducted to them by ditches made on purpose, and leading from the lake or, in some places, from the sea. The water dried up, and the salt remained behind as a deposit. But the majority of salt-workers in those days followed the old method of boiling.

As the success of the operation depended mainly on the condition and correctly timed preparation of the brine, the superintendents of the salt trade began to evolve from time to time different means of producing it. From A.D. 1132 the following method was introduced for preparing brine. The whole of the sea-shore in the neighbourhood of the salt-works was measured out and divided into a number of small, regular squares; the surface layer of earth in each was dug out; the ground was then strewn with straw, and the earth that had been dug out thrown back upon it. The name given to it in those days was *lu*, an oven. The largest *lu*, were not more than 2 ft. high and a fathom in circumference; but at the sides of the *lu* little ditches were made for the brine to run off. After the ovens had been thus arranged, the next step was to soak them with sea-water, and as this was an easy task, it was entrusted to women and children. After a short time the brine in the interior of the ovens gradually formed and ran off into basins. In order to test its degree of strength, small stones of a certain kind were thrown in; if they remained on the surface, the brine was considered good; if they sank under, it was called sweet, and in that case the ovens were abandoned for some other spots in which the earth was more suitable. The brine when fit for boiling was immediately poured into buckets and carried to the ovens. In these were set large evaporating basins, and 3-5 of them were always attached to each brine-oven. The boiling took place at once and was continued without interruption; when ready the salt was immediately shovelled out of the basins, and fresh brine poured in, so that in 24 hours about 5 basins of salt were boiled. Each basin turned out 3-5 piculs (about 18 pud) of pure salt.

Production of Sea Salt.

After the 15th century the following method of procuring brine was pursued in all salt-works on the sea-shore: Pits were dug on the shore and bamboos were laid crosswise over them. The whole was covered with double mats, and sand was strewn on the top. Every morning and evening the covering of sand was soaked with sea-water by the tide, and the salt liquor found its way into the pits. As soon as the water had retired from the shore the salt-workers came out with flaming bundles of straw to test the saltness of the moisture, and they were not convinced of their work being good unless the salt vapour, which rose from the pits, extinguished the fire. The brine thus produced was drawn off and carried to the salt-works, and salt was obtained from it uncommonly quickly. Somewhere about the same date, at the salt-works in the north, the most convenient plan was found to be to obtain the salt by exposure to the air and sun.

At the present moment in China salt is produced under three forms: sea-salt, lake-salt, and well-salt. Sea-salt is either boiled or obtained by exposure, and is found in all the maritime provinces, viz., in Chihli, Shantung,



A SZECHUAN SALT WELL

on the banks of the River Huai, and in Chekiang, Fukien and Kuangtung. Lake-salt is obtained in Shansi, Kansu, and Shensi, and to a certain extent is imported from the country outside the frontier, i.e., from the pasture-grounds of Chahar, from Ordos and Kokonor. Well-salt is obtained in Kansu, Szechuan and Yunnan. Sea-salt is obtained in the most important quantities, for which reason a quantity of descriptions are found, in Chinese writings, of the manner in which it is produced. We borrow from them some details.

The salt-works are dispersed over the whole extent of the line of coast, and are considered better, or worse, in accordance with the quality of their salt. In all of them the manufacture of salt takes place at a fixed season, consecrated by time and custom. According to Chinese notions, the 3rd, 4th, and 6th months (April-July) are the most favorable for manufacturing salt; and they maintain that at this time, when vapours are rising from the ground, the exudation of salt comes into play with them. In autumn the vapours gradually cool, for which reason the exudation also diminishes by degrees; but in winter, on account of the frost, the vapours disappear altogether, and with them the exudation disappears as well. On this account the manufacture takes place only during the hot weather and hardly any occurs in the winter. To obtain sea-salt the Chinese employ two methods: they either boil the brine, or else they leave the sediment of salt in the sun to evaporate.

The period of boiling is divided into three stages, the technical names of which are (1) *Shai-hui* (sunning ashes), *Lin-lu* (filtering brine) and (3) *Fu-huo* (boiling). The preparatory manipulation called *Shai-hui* consists in the following: on the very first day of opening operations in the salt-works the seashore is cleared of weeds, and a beginning is made by digging out the upper layer of earth and breaking it up; this earth when broken up is turned over and over with bamboo poles until it is fine and smooth. Then sea-water is brought from ingenious receptacles, which are filled with water at high-tide, and the earth is moistened with it, as with light rain, equally and thoroughly. Towards evening the earth is shovelled to one side, and a long line of mounds is formed of it, in order to protect it from rain during the night. On the following day the procedure is the same as on the previous day, except that the earth is carried to some particular spot for safety. In fine weather it is taken out again from time to time, and dried on the salt-grounds.

As soon as the earth has been thoroughly prepared, i.e., is completely impregnated with salt particles, the workers take it to the ovens. These ovens, which are shaped like chests, 9ft. long, 2 ft. broad, and 3 ft. deep, are called Lu; near each a well 8 ft. deep is dug. The floor of the oven is strewn with rotten wood; above this are fine bamboos; on them is a layer of brushwood, and above all is a layer of ashes of plants. The prepared earth is shot upon this, beaten hard and covered over with rice straw. On this is poured sea-water, which finds its way through all the inner layers, and flows into the well as brine. Each oven in 24 hours gives more than 20 *tan* (60 pud) of pure brine, which is drawn out of the well and taken to the boiling oven to be boiled. The salt boiling continues without interruption throughout the whole time of the operations. In each oven are several pans of different sizes, part of which are to hold the cold brine, part to boil it. Each boiling begins at 11 p.m. and continues until 10 o'clock on the following morning, and during this period salt is taken six times. As soon as the salt begins to harden, pods of the *tsao-chio* tree (*Gleditschia chinensis*) are thrown into the pans, in order that the particles of salt may combine more quickly, and when the salt is ready the party of men who are watching inform the others of it, in order that it may be cleared out at once and the pans may be filled with fresh brine. On an average 600 catties of the best brine turn out 140 catties of pure salt, called by the Chinese "fire salt" (*huo yen*). It appears in three qualities and colours: white, dark and yellow: the white is the best, the dark not so good, and the yellow much inferior and of a bitter taste.

The second method (exposure to the air and evaporation in the sun of saline sediments) is distinct from the first, in that the brine is not boiled, but poured into peculiar paved tanks, and left there to the sun and wind. For complete evaporation two days in summer and 3-4 at other times are sufficient, and indeed the N.W. wind is quite as favorable to this operation as are the sun's rays; on the other hand, with unfavorable winds, and in rainy weather, no salt is taken.

Almost the whole of the available flats on the coast line along Shantung, Chihli Province, and Fengtien are devoted to salt production, and particularly so the flats about Taku, on the Gulf of Pe-chihli, and Fengtien. Every visitor to Tientsin who proceeds along the Pei-ho River or along the railway must have been struck by the immense mounds of salt either on the flats or at the storage grounds near Tientsin. Also interest could not fail to have been evoked by the curious wind-mills which raise the salt water from the canal connecting the sea near Tongku for distribution to the various beds. These mills are driven by the wind acting upon sails of the pattern usually seen on sampans, and the country is dotted with them for a considerable area. In this issue we give photos of them in operation. The flat which extends to the south of Yingkow for nearly twenty miles is one continuous field of salt-pans, and the same may be said of the flats about Tongku. In Shantung, too, similar conditions obtain at various places. In fact there are ten salt-manufacturing centres in this province belonging to the Government, the total annual production being about 7,490 piculs. In other coastal provinces salt beds are frequent, and in fact extend right down the Tongking coast to Annam and Cochin-China.

The Salt Wells of Szechuan.

The great brine deposits of Szechuan are contained in the south-central part of the province, between the T'o and Min Rivers, which enter the Yangtsze at Lu Chou and Hsu-chou Fu respectively. Near the Min, at the Wu-tung Ch'iao Wells, the brine is found at a depth of about 500 feet, while near the T'o, at Tzu-liu-ching, where the most numerous and most productive wells are worked, the depth runs from 1,000 to 3,000 feet. These two great salt areas lie near the centre of the Red Basin, and the brine is found underlying the sandstone crust which covers it; but brine is found and worked at lesser depths throughout the east of the province, and, even to the east of the Red Basin, such as at the eastern end of the city of Kueichou Fu, where, during low water seasons, pits are dug on both banks of the Yangtsze, brine is struck at a depth of about 30 feet and evaporated on the spot. In the south-west of the province, in the Chien-chang Valley brine is found and worked at Pai-yen-ching—"White Salt Wells"—within the district of Yen-yuan Hsien, where it lies at a depth of about 50 feet. To give an idea of the process of salt manufacture in Szechuan, Sir Alexander Hosie quotes from notes made in his diary when visiting the Kueichou Fu, Tzu-liu-ching, and Pai-yen-ching salt works.

"In the middle of an evidently temporary village at Kueichou Fu I found a wide pit, about 30 feet deep, at the bottom of which brine was bubbling up at two places a yard or two apart and men busy as ants dipping their buckets in the brine, carrying them up the sides of the pit, and emptying their contents into wooden tubs, whence the brine was led by outlets, covered with bamboo sieves, into shallow wooden troughs connecting with cement-lined storage tanks of no great size or capacity. From the tanks the brine was baled into smaller wooden tubs, also provided with sieves and lengths of bamboo, leading to large iron circular evaporating pans, about a yard in diameter and a foot in depth. These pans fitted loosely into circular holes in the ground, beneath which were large open furnaces visible from small openings through which they were supplied with coal. Under each furnace was a tunnel, about 4 feet high and 3 feet wide which acted as a draught chamber, and carried the smoke through cinders banked on the opposite side of the evaporating pan. The brine in the pans was boiling and in process of crystallization, and I was informed by the workman that one or two days were required to complete the evaporation, the furnace being kept burning night and day. Pan and granular salt were both being evaporated. The furnaces which are built of mud and cinders, have to be rebuilt every ten or twenty days, and the fact that evaporation can be carried on for only four to five months out of the twelve accounts for the temporary character of the works. During the rest of the year the shingle bank is covered by the rise in the river, when work is, of course, impossible, and the same conditions apply to the works on the south bank. The salt on production costs 20 cash a catty; but there is a likin station at the works through which all the salt has to pass, and which, after duly weighing each load, exacts 12 cash a catty, bringing the price up to 32 cash. When the tax has been paid the load is lightly sprinkled with a red powdered substance, which takes the place of a seal.

I gathered that the total number of furnaces at work amounted to some 110 on both banks of the river, and I think that the output of both pan and granular salt for the five months cannot exceed 30,000 piculs, or about 2,000 tons.

It is necessary to explain here what is meant by pan and granular salt. Pan salt is the salt that crystallizes and cakes on the side of the iron pan during the boiling and evaporation of the brine. This is caused by keeping the furnace well supplied with fuel and developing great heat. In the case of granular salt less heat is applied, and the crystals form and remain separate without caking. At Kuei-chou Fu the brine is as clear as the water of the Yangtsze itself, and no purifying of the granular salt, such as is practised at Tzu-liu-ching, is required. Pan salt may be of any thickness from 2 to 6 inches, and being shaped like the pan, and therefore inconvenient for transport purposes, it is broken up usually into four pieces."

The Tzu-Liu-Ching Wells

The following may be taken as an accurate description of the brine wells of Tzu-liu-ching:

"I found myself seated—a settle had been procured for me—beside a square stone embedded in the ground, with a central hole a few inches in diameter. From the hole there was issuing a hempen rope about an inch thick, which ascending, passed over a movable wheel fixed at the top of a staging some 60 feet high, and bearing a striking resemblance to the shears at a dockyard. On leaving the shears the rope descended and passed under another wheel fixed a few feet above ground, whence for the moment it escaped from our range of vision. After the lapse of a quarter of an hour the top of a tube, from 9 to 10 inches in circumference, attached to the rope, made its appearance, and was drawn up to within a foot of the wheel. Meantime a workman stationed at the mouth of the well had thrown a rope round the tube, which was composed of the stems of a number of bamboos fixed together, and immediately the lower end appearing he drew it to one side and over a wooden reservoir built into the ground. Embracing the tube with his left arm, he plunged an iron rod which he held in his right hand into the bottom, and, raising a leather valve which was there adjusted, allowed the contents, consisting of black, dirty-looking water, to escape into the reservoir. This was the brine. The tube was again placed over the well, and descended with great rapidity. Whence the motive-power that raised the brine? Following the rope after it left the second wheel I found that it entered a large shed, the floor of which was several feet underground. In the centre of the building was an enormous bamboo wheel or drum, 12

feet in height and 60 feet in circumference, placed on a vertical axis to which the rope was attached 6 feet from the ground. As I entered four huge water-buffaloes were being harnessed at equal distances to the circumference of the drum; each buffalo had a driver, whose duty it seemed to be to belabour the animal with a short, stout hempen rope to induce it to break into a trot. As the drum revolved the rope coiled round it at a sufficient height not to impede the buffaloes. For a quarter of an hour—this is, until the tube had been raised—this unmerciful beating went on, when the poor beasts, exhausted, white with froth, were unharnessed and led back to their stable, whence a fresh relay was brought. When the animals were unharnessed and the signal given the drum reversed with great velocity, creating a violent wind all round. Forty animals were employed at this well, and each relay raised the brine about ten times every twenty-four hours. They are specially selected for the work, and cost from Tls. 40 to Tls. 50 apiece. The specimens I saw were fat and in excellent condition, but although they are carefully fed and attended to, each costing 300 cash a day, their staying power does not exceed five years. Many even fall within the first year; nor is this to be wondered at, for the make of the animal fits it for a slow plodding life only.

Natural Gas

"Retracing my steps to the large reservoir by the well, I found that the brine was being carried off in bamboo pipes laid down between it and smaller wooden reservoirs in the evaporating sheds, which I next visited. On the floors of the latter rows of brick furnaces, with round openings at the tops, were built. On each furnace rested a round, shallow iron pan, about 4 feet in diameter, filled with brine conducted in open bamboo pipes from the reservoirs, which occupy one side of the shed. Where was the fuel? Under each pan was a flame blazing from a bamboo tube coated with lime and fitted with an iron burner, while all round flames burst from smaller upright tubes and lighted the sheds, for there was no cessation, night or day, in the work of evaporation. I was next conducted to the 'fire well,' whence the fuel is procured. It was quite close to the brine well, and was carefully built over bamboo tubes covered with lime—to prevent escape—ramifying from the cap covering the mouth to the evaporating sheds. There can be little doubt that the 'fire wells'—which are nearly all situated within the town—contain petroleum, from which the vapour or gas arising supplies the natural fuel. They have, however, never been worked for the oil. The stench which permeates the whole town reminds one forcibly of a gasworks, but the gas has not, as in some parts of Ohio, been utilized to light the streets. All the wells, which are worked by private companies, are now under Government control, and there is an office established at Tzu-liu-ching through which all salt transactions are carried on. The actual cost price of the salt is 13 or 14 cash a catty, but the Government manages to extract from buyers 22 to 23 cash.

"The salt is of two kinds—pan, or lump and granular salt. The former is from 2 to 3 inches in thickness, and is of the same shape and size as the evaporating pans. In preparing the latter, bean flour is used to give it a whiter appearance. The work of evaporation occupies from two to five days according to the strength of the gas flames. As the salt wells number over a thousand, and the 'fire-wells' only about a score, much of the brine is carried into the town for evaporation. Pans are leased by the year, the privileges costing about Tls. 40 each. A contractor supplies the pans, which weigh 1,600 lbs. apiece, for from Tls. 30 to Tls. 40 a year each, the old pans, which are changed about once a fortnight, being the property of the contractor. Brine is found at depths varying from 700 to over 2,000 feet, and from a dirty yellow in the shallower, becomes a deep black in the deepest wells. Twice as much salt is evaporated from the black as from the yellow brine—the deeper the well the stronger he solution. As the region in which the wells are situated is of sandstone formation, the difficulties of boring to these great depths, even with primitive machinery, are not very great. A bamboo lever is erected over the spot where the operations are to be carried on; an iron jumper, over 100 lbs. in weight is attached by a bamboo rope to the thin end of the lever; on both sides of the thicker end scaffoldings with plankways are built; several men jump simultaneously from the planking on one side to the planking on the other, using the lever as a stepping-stone; and the jumper is raised, released, and falls, crushing the stone, a rotary motion being imparted to the weight by a man who stands by the mouth of the well, and twists the bamboo rope as the lever is about to drop. The rope is lengthened as required by adding strips of split bamboo. I have heard doubts expressed as to the depths of these wells, but the figures given are unimpeachable. The well which I visited was over 2,000 feet in depth, and I arrived at this result by a very simple calculation. The drum was 60 feet in circumference, and thirty-four coils of rope were wound up before the tube reached the mouth of the well. In boring in the vicinity of the town, at least, it is impossible to predict whether petroleum or brine will be struck, but as both are valuable, the result is always satisfactory."

The diameter of the mouth of the well is usually from 9 to 10 inches, and the diameter of the bamboo tube-bucket 4 inches. The length of the latter depends on the height of the triped shears, and may run to 80 odd feet. The wells are lined for the first 200 or 300 feet with cypress wood in lengths of about 6 feet. These are first cut in two lengthways and then hollowed out. A bamboo tube-bucket costs about Taels 20, and the hemp rope costs another Taels 20. Mules, oxen and water-buffaloes are all used for turning the whim, or drum, which winds up the bucket. The cost of raising the brine runs from 12 to 14 cash a catty, and of evaporation 2 to 4 cash; but the latter is regulated by the price of coal, which is brought into use only when the gas is being employed to its utmost capacity. These prices refer to a brine well in juxtaposition to a hydrogen well; but, as much of the brine has to be carried to the gas evaporating sheds, the cost of carriage has to be added, and it may be taken for granted that 20 cash represent the fair average value of a catty of salt before taxation. The amount of salt evaporated from the brine rises from 7 per cent., in the case of the yellow liquid from the shallower wells to 13 per cent. for the black drawn from the deep wells. In manufacturing granular salt from black brine the following purifying process is adopted:—

Yellow soja beans are ground up with cold water in a stone mill. The liquid with the ground beans is collected, poured into a pan and warmed. It is then filtered through a strainer on the top of the boiling brine, causing precipitation of the impurities in the latter. The floating impurities are skimmed off, and the salt crystals baled into a bamboo basket, which retains the solid matter. The salt crystals are now fairly white, but if still further purification is desired, the water in the pan is poured over them and drains away any remaining impurities. The liquid so drained, called "*Tan Pa*," is used to cause coagulation of the legumine in manufacture of beancurd, and, for convenience of transport it is evaporated, resulting in a substance as hard as stone.

The Pai-yen-ching Wells

"The brine wells of Pai-yen-ching, in the south-west of the province, are two in number—one is off a dirty street, the other behind the town. They are both about 50 feet deep. The mouth of the former is some 8 feet long and 2½ feet broad, and the brine is raised in narrow wooden buckets, to the sides of which bamboos tied together are fixed, and serve as raising handles; the latter has four round mouths lined with wood, and the brine is raised in round wooden tubs with similar bamboo handles. The evaporation pans, which are manufactured from iron obtained in neighbourhood, are cone-shaped—the apex of the cone forming the bottom—and vary in height from about 1 foot to 2½ feet. They are serviceable from 10 to 20 days. The furnaces are built of mud with holes for the pans; and coal (lignite) is the fuel used. The process of evaporation is as follows: a litttle brine, which is light in colour compared with that at Tsz-liu-ching, is poured into the heated pan; the brine bubbles up to the top of the pan, and deposits a thin layer of salt on the inside; a little more brine and another layer is the result, and so on until the salt is some 3 or 4 inches thick. Care must be taken to keep the pans supplied with brine, otherwise the salt cones would crack and break up. (They are transported whole on the backs of pack-animals). Two days and nights are required to evaporate the necessary size. This salt, which is very much inferior to the salt produced at Tzu-liu-ching, supplies the south-west of Szechuan, finding its way even north of Ningyuan Fu. There are seventy-two evaporation houses, the number of pans in each varying from twenty to thirty. The total production is over 2,000 catties a day. The pans vary in price according to size, the larger costing 1,800 cash each. The coal (lignite), which is found west of Pai-yen-ching, is exceedingly cheap, about a cash a catty. It is found just under the surface of the ground, and little labour is expended in mining it. About 3,000 catties are daily consumed by a house boiling ten large and ten small pans. The price of salt when it leaves the evaporator's hands is a little over 30 cash a catty; but there is a local Government tax of 12 cash a catty, so that the actual cost to the consumer (on the spot) is over 40 cash.

"The above is a description of the work of salt evaporation in the east, centre, and west of Szechuan; but, the greatest centres of the salt industry lie in the centre of the province at Tzu-liu-ching, where alone natural gas is utilized, and Wu-tung-ch'iao, near the banks of the T'o and Min Rivers respectively. At the latter place, which ranks second to Tzu-liu-ching in output, only pan (or lump) salt is manufactured. It is of a decidedly black colour, and is exported in large quantities to Kweichou and Yunnan. Coal from the hills lying behind the right bank of the Min, and opposite the salt-yielding area is the fuel used on the evaporation. There are altogether forty districts of Szechuan which produce salt, and withered grass, lignite, wood, coal, and gas are all taken advantage of, each as the others are unavailable, for fuel.

"Various and very varied estimates have been made of the annual production of salt in Szechuan. I have made inquiries from time to time in China regarding the consumption of salt in family life, and I have found that the amount differs according to the supply of salted fish, vegetables, and food generally procurable in the market. If they are abundant the family consumption is less, and vice versa. In Szechuan there is practically no salted fish, but vegetables are salted and exported from the province, and the result of my inquiries it has led me to consider that 10 Chinese ounces per month, or about 8 catties a year, may be taken as a fair estimate of individual consumption. In this estimate, I am allowing for a reduced consumption by children. If, then, the population of Szechuan be taken as 45,000,000 the annual consumption of salt would be 360,000,000 catties, but the province supplies Eastern Hupeh, nearly the whole of Kweichou, and north-eastern Yunnan. It has been ascertained that the Salt Office at Ichang annually levies on Szechuan salt entering Hupeh a sum approaching Tls. 2,000,000 and that the tax amounts to 28 cash a catty. Taking the value of the total to be 1,200 cash, the tax would annually account for an import into Hupeh through Ichang of 86,000,000 catties. I propose to take 80,000,000 catties as the minimum of Szechuan salt passing through Ichang and add 4,000,000 catties for salt carried overland into Hupeh as well as for consumption in that province to the west of Ichang. Kweichou and Yunnan remain, and it may be fairly assumed that the population of these two provinces drawing salt from Szechuan does not exceed 5,000,000. At the annual allowance

of 8 catties per head Kweichou and Yunnan would require 40,000,000 catties. On this basis I am forced to the conclusion that the annual production of salt in Szechuan amounts to not less than 484,000,000 catties. This, however, does not include what is used in pickling, salting, and other industries, and I am inclined to put the total output at about 500,000,000 catties, equivalent to some 300,000 tons. It may be asked, how does this compare with other estimates? I take two writers on this subject. One gives 206,181,600 catties as the total production, which would place each individual in this province alone on the altogether inadequate allowance of about 6 Chinese ounces per month, or 4½ catties a year; the other states that he considers the production of the districts for which the T'o River is the outlet to be 600,000 tons, i.e. 1,008,000,000 catties, which would give each inhabitant of Szechuan over 22 catties a year, a manifest superabundance derived from only one, but indoubtedly the richest, salt area in the province.

"The Salt Commissioner's figures fall slightly short of my estimate, but they do not cover illicit salt, which is produced in considerable quantities, and eludes official cognizance. Of this illicit salt it is impossible to form any trustworthy estimate. Some would have me believe it amounts to 50 per cent. of what is controlled by Government, but if even 10 per cent. be added to the Commissioner's figures the result exceeds 500,000,000 catties or about 300,000 tons. If, then, 20 cash be taken as the cost price of production of this amount, the total value at the wells is Tls. 8,607,265.

"At the centres of production salt, after payment of the Government tax, is retailed for consumption within limited areas; but salt intended for consumption throughout Szechuan generally is transported under Government certificate, and at destination retailed under licence. The retail price is also fixed by Government, and varies from time to time. The present price at Chengtu is 51 cash, or less than 1d. a lb."

[It must be understood that no claim is made to originality in this article. Various authors who have made personal studies with regard to this subject have been freely consulted, in order that a compilation might be made giving a fairly accurate idea of the past and present method of controlling and manufacturing the product. Special acknowledgment has to be made to the following: F. Hirth, "Notes on the Early History of the Salt Monopoly in China," ("Journal of the China Branch of the Royal Asiatic Society"); Arthur von Rosthorn, "The Salt Administration of Szechuan" ("Journal of the China Branch of the Royal Asiatic Society"); E. H. Parker, "The Salt Revenue of China" ("Journal of the China Branch of the Royal Asiatic Society"); P. Zwehtkoff, "Remarks on the Production of Salt in China" ("Journal of the China Branch of the Royal Asiatic Society"); Dr. J. Edkins, "Banking and Prices in China,"; H. B. Morse, "Trade and Administration of the Chinese Empire" E. S. Williams, "Taxation in China" ("Quarterly Journal of Economics"); Masnoske Odagiri and Kokichi Midzuno, "Salt Gabelle Revenue of China;" "Report by Consul-General Hosie on the Province of Szechuan;" and Maritime Customs' Reports.]

TOKYO INDUSTRIAL EXHIBITION

The estimated expenditure, of 950,000 *yen*, for the Industrial Exhibition to be held in Tokyo in the same year in which the coronation of H.M. the Emperor will take place, has been submitted to the Municipal Council. The amount is thus allotted:—176,000 *yen* for 1913-1914; 724,000 *yen* for 1914-1915; and 50,000 *yen* for 1915-1916. A building covering 2,800 *tsubo* will be completed within next year and in 1914 the main building, covering over 10,000 *tsubo* will be erectedf or use from August to December. No opposition is offered to the scheme from any quarter whatever, but in view of the impoverished condition of all available sources of revenue, how to meet the required expenditure will prove a tough question to solve, says the *Jiji*.

INDIAN RAILWAY EARNINGS

The statement of the approximate gross earnings of the Indian Railways shows that for the period, April 1st to Octr. 26th, 1912, the total earnings of State and Guaranteed Railways have risen to Rs. 3,066¾ lakhs, which is no less than Rs. 363 lakhs better than for the same period last year. The principal contributors to this increase are the Bengal-Nagpur with Rs. 59½ lakhs; East Indian with Rs. 73¾ lakhs; Great Indian Peninsula with Rs. 50½ lakhs; Madras and Southern Maharata with Rs. 10½ lakhs; North Western with Rs. 95½ lakhs; Oudh and Rohilkhand with Rs. 26¾, lakhs; and Rajputana Malwa with Rs. 24⅓ lakhs.

DEVELOPING THE PHILIPPINES

America-Philippine Company

Another splendid development investment in the Philippines is promised in the recently organized and incorporated America Philippine company, reports the *Manila* Times of December 4, and continues:—Composed of a group of well known business men and bankers of New York, Chicago, St. Louis, Kansas City, Detroit, Cincinnati, Indianapolis, Minneapolis and other cities it proposes to interest itself in the development of the products of the Philippines. It has a capital stock of P. 10,000,000, fully subscribed and its members are capable of furnishing any further capital that may be needed.

Full details of the plans of the company have not been received here but it is known that one of the plans of the new company is to interest Filipinos in the several local enterprises that will be undertaken and to induce them to share in them, to introduce a system of profit sharing in which all employes will have participation and at the inception of any business or enterprise to inaugurate a system of pensions for employes to be paid when old age prevents full service.

A party representing the company will leave New York about the middle of December and will arrive here about the middle of January. They are coming for a general survey of the islands and a study of resources, needs and business opportunities. They will be accompanied by experts in fibers, sugar, tobacco, hardwood and power and will be in a position to expert any proposition that is presented to them.

Speaking of the plan of the company a man who has some knowledge of the circumstances under which it was formed said: "I am not myself in possession of full details but I am convinced that the organization of the America Philippine company is a fortunate circumstance for all of us. It means an opportunity to secure, under fair conditions, the money that is needed to develop the Philippines. This company has ample capital and can secure as much more as is desirable. And it comes in a friendly spirit. It wants to join with the people of the islands in developing the resources of the islands and with mutual profit and benefit. I know that it has plans of profit sharing for its employes and that in itself is a good line on its liberal spirit and policy. Capital is our great need, not that which would exploit us for its benefit, but capital that would develop the country and benefit the country and the people of the country. We need money to finance our great agricultural industries and this company can furnish it. It is my personal intention to see that when the agents of this company arrive here they examine the problem of furnishing money for the great agricultural industries of the islands. I am pleased for another reason. The formation of this company at this time shows a confidence in the stability and future of the Philippines that will be reassuring to any who have permitted their faith to waver."

FAR EASTERN CABLES

Eastern Extension Company's Plans

The 81st ordinary general meeting of the Eastern Telegraph Company (Limited) was held on November 13, at Electra House, Finsbury-pavement, Sir John Wolff Barry, K.C.B., presiding.

The Chairman remarked that the gross revenue for the half-year ended June 30 last exceeded that of any previous half-year, while the improvement shown continued to be well maintained. The gross revenue amounted, in round figures, to £746,700, or an increase of £74,300 over those of the June half of 1911. Message receipts showed an increase of £66,500, which was spread over practically every branch of the company's system. The introduction of deferred messages, to which he referred at their last meeting, had also created a new source of revenue, while not adversely affecting their ordinary fully-paid traffic. The total ordinary working expenses amounted, in round figures, to £306,000, or an increase of £14,700 over those for the corresponding half-year of 1911. The growth in the volume of traffic necessarily entailed more labour and naturally tended to generally increased expenditure under practically all headings. In view of the continued depreciation in the market value of their reserve fund investments a further sum of £50,000 had been transferred from the general reserve fund, and the amount set aside on account of investment fluctuations now stood at £300,000.

The increasing volume of business on the company's cables, which was proportionately greater than the increase of net revenue, pointed to the necessity of strengthening their cable capacity east of Suez, and the directors had in view the laying of new and important cables from that station eastward so soon as the necessary landing rights were granted. The Eastern Extension Company also proposed at the same time to strengthen their means of communication in the Far East. The new cables would, of course, involve considerable expenditure, which would be met out of the normal increase of revenue. Their reserves enabled them to deal with these matters without any anxiety regarding the usual dividends and bonus, or without increasing their capital.

THE YELLOW RIVER BRIDGE

On November 16 the last rivet was driven at the Hoangho bridge built by the Maschinenfabrik Augsburg-Nurnberg, near Tsinanfu. Amongst the guests present there were the Tutuh of Shantung, the Commander of the fifth division, the directors Ye and Meng of the Ministry of Public Works (representing the Minister), Messrs. Hsiao, Hsu and Liu, directors of the Northern part of the Tientsin-Pukow Railway, and Mr. Chao of the southern part, Captain Hopfner, representing the Governor of Kiautschou, members of the German Consulates of Tientsin and Tsinanfu, and of the British consulate of Tsinanfu, officers of the garrisons of Tsingtau, Mr. Cordes, Manager of the Deutsch-Asiatische Bank at Peking, Mr. Dorpmuller, Engineer-in-Chief of the Tientsin-Pukow Railway, and his staff, and many other guests with their ladies from Peking, Tientsin, Tsingtau, Nanking and Shanghai.

THE FAR EASTERN REVIEW

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THE SHORT CUT TO PEKING

China has opened her shortest cut from the entrepôt of Shanghai, on the sea, to the Capital of Peking. Early this month through traffic was opened from Pukow, on the Yangtsze River, (opposite Nanking), to Tientsin, and a journey is now possible from Shanghai to Peking in 40 hours as against five days by the previous shortest route. The only other line from the Yangtsze to Peking is that from Hankow, a length of some 755 miles. The newly opened line from Pukow to Tientsin is 626 miles, and to that has to be added the 73 miles from Tientsin to Peking and the 193 miles from Shanghai to Nanking, making the total rail distance from Shanghai to Peking some 892 miles, which is broken only by the Yangtsze river at Nanking. The first through trains to run over the line from Pukow to Tientsin left Tientsin and Pukow respectively on December 4, and two trains per week are now running from both places, leaving Pukow for Tientsin on Mondays and Fridays at 9.00 a.m., and arriving at Tientsin on the following days at 11.07 a.m.; and leaving Tientsin for Pukow on Wednesdays and Saturdays at 1.00 p.m., and arriving at Pukow on the following afternoons at 3.15 p.m. Sleeping berths cost $5, and the first class fare from Pukow to Tientsin is $42.10, the second class is $28.05, and third class is $14.05, the baggage allowed first class passengers being 150 catties, second class 100 catties, and third class 50 catties. The trains at present running are provided with dining cars and comfortable sleeping cars, and, with the exception of the break at Nanking, passengers may make the journey in comparative luxury.

Penetrating, as it does a vast agricultural plain the new line promises to be a source of abundant revenue to the Government, and should be equally as profitable as the excellent revenue producing lines in the northern system if efficiently conducted. The management of traffic, is, however, solely in the hands of the Chinese themselves, and is not supervised by foreigners as in the north, and this will be the determining factor as to whether or not the line will pay as it should do. Shippers of goods are already feeling the effects of a significant and startling development in transport company development on the southern section, and in the interests of efficient traffic management we feel it necessary to point out to the high officials of this portion of the railway, and the Ministry at Peking the necessity for a scrupulous regard for the interests of the shippers, and prospective shippers, of produce along the line.

The greatest care should be exercised to attract traffic to the line, but it would seem that so far nothing is being done to give the individual shipper in the south the facilities that he should have in order to influence him to use the railway for the transport of his goods. Instead, it is reported on the highest authority, he is confronted with aggravating and costly deterrents. Freight rates are in the hands of rival transport companies to such an extent that the usefulness of the line is being considerably impaired, and this report warrants the strictest investigation from those in authority. We do not believe that the responsible officials are aware of what is afoot to rob the Government of the just returns that it should enjoy.

It appears that there are a number of transportation companies, namely the Zai Tai Hun, Yu Toong, Yuan Chia, Yuen Kea, Wai Toong, Chong Kee, Sih Chen, Yah Lai, Tsin Nih, Toong Yuan, Yuen Lei, Tsih Yuen, Foh Shin, Lee Toong, Lee Shun, Poo Lee and Kwen Dal, and probably many others, already operating. They are alleged to pay some $3,000 each for a permit to carry on business. Many of the station masters, it is asserted, have shares in them, and, naturally, they favour the companies in which they are interested. Various lower grades of the railway service also participate in opportunities to squeeze, and this imposition is so heavy that several of the competing concerns have gone under. Unless a sufficient squeeze be given, the consignor is punished in many ingenious ways; trucks hired by him develop hot box by a strange accumulation of sand on the bearings, his goods are delayed and damaged, and he is speedily brought to a realization that the only way to secure transport is to surrender to the demands of those in whose power his goods eventually fall. In some respects, too, the transportation companies, owned, as they are by individual merchants, are used to kill commercial competition, and taking all in all the system is without a redeeming point.

It may be assumed that the higher Chinese officials connected with the railway do not know of the abuses that have developed as a consequence of the adoption of the principle of farming out transportation rights, and that, now that their attention is drawn to them, they will take steps to prevent the continuance of a system that must necessarily excite criticism. They must be particularly anxious to make the best possible showing on this new line, where no foreigners are employed in the traffic department, and comparisons, if things on the southern section continue in the present chaotic state, are certain to be made with the lines operated under foreign direction. There is an alternative system, based upon that in operation in India, which has been successfuly employed by the management of the Shanghai-Nanking Railway, and which might, with advantage, be adopted on the Tientsin-Pukow line. In brief, the principle

of the method of booking goods is that everyone has a right to book his goods direct with the railway, but in India it is possible for merchants to employ one firm under power of attorney to book their goods and to do all their goods shed transactions for them. On the Shanghai-Nanking line what are called transporting agencies are allowed to act practically as attorneys for merchants who employ them, but in addition and separately, every facility is given to individuals to book goods for themselves and there is the Railway's own goods clerk to assist them. After goods are booked either by an individual or by a transport agency, they are taken in hand by the Goods Compradores who inspect, weight, examine (to see that the goods are what they are represented to be) check, supervise the loading, and seal the goods for despatch. In regard to goods that come by train they check the cars, supervise unloading and deliver them to the owners. It is also part of the duty of these compradores to canvass for the Railway, and introduce customers. Since these men have been employed the traffic has more than doubled and the Railway places great value upon them. The system works smoothly and there are no complaints. The distribution of the cars is under the direct control of the Deputy Traffic Manager, and transport facilities are given strictly in accordance with priority of application. All orders are placed in a book available to the public, and the cars are daily apportioned according to demands. The only trouble is that there is nothing like a sufficiency of cars.

If the higher officials of the Tientsin-Pukow Railway wish to avoid comparisons that can only result in an exposure of the ineptitude of Chinese management as compared to foreign, they will lose no time in insisting upon the adoption of a proper system of goods transportation. At the present time it is particularly important from the Chinese point of view that Chinese officialdom should be able to show substantial justification for their claim that foreign supervision can be profitably dispensed with.

PHILIPPINE MINING POSSIBILITIES

In another portion of this issue we publish portion of the excellent report issued by the Division of Mines of the Bureau of Science at Manila on the mineral resources of the Philippine Islands for the year 1911. It will be seen, that generally speaking, the mining industry is showing satisfactory, though not unduly rapid, development. Since that report was issued, however, there have been some striking developments in regard to gold-dredging in the district of Paracale. Of importance also is the completion and successful operation of the large modern mill of the Colorado Mining Company in Masbate. In connection with the Paracale district a remarkable rise in the price of the shares of the Philippine Exploration Mining Company had prepared the public mind for a sensational announcement. No surprise, therefore, was expressed when it was announced towards the end of November, that a run of 13 days of the Gumaus dredge had yielded the splendid return of 1,050 ozs. This is a record for production in the Philippines and a performance that ranks high in comparison with dredging records elsewhere. The bullion value of this yield was P. 38,050.

Mr. John S. Hord, the President of the Bank of the Philippines, who recently visited Paracale, with a party, speaks enthusiastically of what he saw, and predicts an extremely bright future for the mining industry in the Philippines. Mr. Hord believes that no less than P. 3,000,000 will be produced in the Philippines next year and he expects to see the insular possession take its place among the important gold producers of the world when the mining industry is fully developed.

The future of the mining industry in the Islands is dependent, like that of every other industry, upon the provision of adequate capital. Capital is notoriously timid. It is essential that security should be felt by those who are invited to invest their money in propositions in the Islands. The reports issued by the various bureaux of the Insular Government show that the inherent possibilities of the Philippines are practically boundless. The labour difficulty is being overcome. The excellent system of technical and other training has removed what was at one time the great stumbling-block to the advancement of the Islands. The Filipino is beginning to learn that labour has a greater reward than what is represented by the mere wage paid. He is learning that faithful and honest work gives the wage-earner a sense of self-respect that is entirely unknown to the idler, or to the man who scamps his work. It is to be hoped that Congress in their wisdom will do nothing to upset the *status quo* in the Philippines and that the present movement of progress in the Islands will not be arrested by any action taken with the mistaken object of advancing the interest of the Filipinos.

NOMENCLATURE ON CHINESE RAILWAYS

A highly commendable step has been taken by the Chinese Department of Railways in organising a special committee on railway nomenclature with the object of standardizing technical terms in the railway service. The committee has been subdivided into three groups, namely, Equipment, Engineering and Administrative. With the immense extension of railways throughout China, some definite system of nomenclature is evidently desirable. At present matters in this connection are in a state of chaos. This was inevitable in view of the fact that the railways in China were constructed under the supervision of foreign officials representing different European countries, America and Japan. There is a natural and perfectly excusable desire on the part of any official so employed to endeavour to secure the adoption of his mother-tongue in connection with the line upon which he is engaged. An indication of the difficulties that are caused by the desire of each nationality to push the claims of their own language in connection with the railways of China is to be found in the spelling of the names of the stations on the Peking-Hankow line. There the French translated the Chinese names of the railway stations according to French principle, whilst in North Manchuria the sign-boards at the stations are inscribed in Russian characters. This renders the latter uninformative to a large percentage of the foreign travellers, whilst the spelling of Chinese names on any other than the style adopted by the postal service or maritime customs is distinctly puzzling and inconvenient.

For many years past there has been an endeavour to devise some method of transliteration of Chinese characters according to one universally accepted standard. Looking at the matter from a commercial and particularly from a railway point of view, we learn with gratification that the Department of Railways has taken this highly important matter, small as it may seem to some, in hand. In view of the fact that English is admittedly the commercial language of the world, it would seem desirable and equitable that whatever system be finally adopted, the claims of English to priority should be kept steadily in mind. We shall await with great interest the report of this special committee.

CAPITAL VALUES IN AMERICA

According to the estimates of the national wealth of the United States made by the Bureau of the Census the value of the railways increased but little more than half as fast as the value of all property from 1890 to 1904.

From 1900 to 1910 the capital value of agriculture increased from (U.S. currency) $20,439,901,164 to $40,991,449,090; the capital value of manufactures from $8,975,256,000 to $18,428,270,000; the cost of road and equipment of the railways from $10,263,313,400 to $14,387,816,099.

The gross value of the products of manufacture increased from $11,406,927,000

in 1900 to $20,672,052,000 in 1910. The total operating revenues of the railways increased from $1,487,044,814 to $2,750,667,435. Thus the increase of 81.2 per cent. in the gross value of manufactured products was accompanied by an increase of 105.3 per cent. in manufacturing capital; while the increase of 85 per cent. in the total operating revenues of the railways was accompanied by an increase of only 40.2 per cent. in their cost of road and equipment.

The capital value of agriculture includes all farm property, land, buildings, implements, machinery, and live stock as enumerated by the census. The capital value of manufactures, as defined by the census, includes the value of property employed for the purposes of production, excepting rented property, but does not include any allowance for patent rights or good will. The capital value of the railways used in this comparison is the "cost of road and equipment" as it stands on their books and as reported by them to the Interstate Commerce Commission.

The report of the Bureau of the Census for 1900 indicated that the gross capitalization of the industrial combinations then in existence was more than twice as great as their capital value. The gross capitalization of the railways was about 12 per cent. greater than the cost of road and equipment in 1900 and 28 per cent. greater in 1910. The net capitalization of the railways, which is the amount for which they are responsible to the public, almost exactly coincided in 1910 with the cost of road and equipment.

Because of the peculiar nature of the industry, it is impracticable to arrive at a satisfactory and comparable estimate of the net return on the capital in agriculture. The greater similarity of the manufacturing and railway industries permits estimates of the return on capital that in a broad and general way are comparable. Approximately, the percentage of net return on the capital value of manufactures in 1900 was 17.119 per cent. and that on the cost of road and equipment of the railways 4.650 per cent. In 1910, when the capital value of manufactures had increased 105.3 per cent., the percentage of net return was 12.041 per cent., while on the cost of road and equipment of the railways, which had increased 40.2 per cent., the percentage of net return was 5.729 per cent. That is, in 1900 the percentage of net return on capital in manufactures was nearly four times as great as that on the cost of road and equipment of the railways; in 1910 it was over twice as great. In both cases the interest on capital is included in net return.

While these comparisons are subject to qualification, it is not believed that, were absolutely accurate and comparable data available, there would be any substantial change in the general conclusions.

These facts 'and figures which are based on official statistics of United States Government are from the recently issued Bulletin No. 39 of the Bureau of Railway Economics.

THE PHILIPPINES AND PROSPERITY

If hard times have struck the Philippines, customs statistics for the first four months of the present fiscal year do not show it. Every department of the bureau of customs reports an increase in collections during that time. Practically every month has seen an increase in every department.

The increase in collections on imports during the months of July, August, September and October, amounted to almost a million pesos as compared with the corresponding period of last year. A similar comparison shows an increase of P. 328,307 in collections on exports.

The total increase in collections over the same four months of last year amounts to P. 1,324,582. Of this sum, P. 80,000 is accounted for by increased collections on wharfage; P. 3,701 by increase in license collections; P. 1,817 by an increase in stamp collections; P. 1,236 by an increase in immigration dues.

The comparative figures for collections on imports and exports are given below:

1911	Imports	Exports
July	P. 1,020,386.04	P. 61,399.06
August	1,126,101.24	162,585.98
Sept.	1,105,301.10	146,421.89
October	1,100,193.74	97,953.34
Total	4,351,983.02	468,360.27
1912		
July	1,477,146.50	155,063.92
August	1,687,273.21	222,308.38
Sept.	1,109,655.53	179,248.94
Oct.	987,037.84	240,046.14
Total	5,261,113.08	796,667.38
Increase	909,130.06	328,307.11

Balabac collections for October are not included in this report.

BRITISH AND CHINESE CORPORATION, LTD.

The fourteenth annual ordinary general meeting of this Corporation was held on November 21, at the Cannon-street Hotel, London, E.C., Mr. C. C. Macrae presiding.

In the course of his statement the Chairman, referring with satisfaction to the record of the Corporation, said that it had financed and supervised the building of practically all the railways in China which had been constructed with British capital. These railways, the section from Shanhaikwan to Newchwang of the Imperial Northern Railways in the north, the Shanghai-Nanking Railway, and, through Chinese Central Railways, Limited, the southern section of the Tientsin-Pukow Railway in the Middle Kingdom; and, lastly, the Canton-Kowloon Railway in the south, had a total mileage of 837 miles, and were, he was told, as solidly and well constructed as any railroads in Europe or America. Then, in the way of financial results, the Corporation had throughout its 14 years of existence paid dividends averaging 10 per cent. per annum over the whole period, and had accumulated funds invested chiefly in liquid securities, which represented about twice the amount of its paid-up capital, after providing for the liabilities other than contingent calls on some of the investments amounting to something over £10,000, as shown in the balance-sheet. Turning to the balance-sheet, the general reserve account was increased by transfer from profit and loss account from £100,000 to £110,000. Debtors stand at £4,150, against £19,065. The profit and loss account showed the amount expended in general expenses to have been £7,884, against £8,099 in the preceding year. The revenue of the year was £25,261, against £33,092 in the previous year, or a reduction of £7,831. This was due to the revolution in China, which naturally prevented the doing of business with the Government, and not only prevented the completion of various pending pieces of business, but made it for the time being, unprofitable to negotiate fresh business.

Mr. C. S. Addis seconded the adoption of the report and the declaration of a dividend of 10s. per share, and this was unanimously agreed to without discussion. Sir David M. Barbour, K.C.S.I., was also re-elected to the board, and the proceedings then terminated.

HYDRO-ELECTRIC PLANT FOR MANILA

The following is from the *Manila Daily Bulletin* of December 7:—

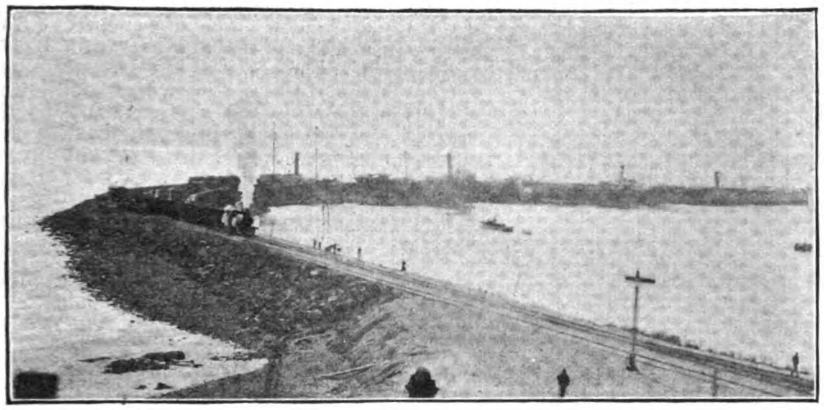
The favorable report of the expert who has just completed his investigations of a site for a hydro-electric plant near Pagsanjan is at hand and as a result the Manila Electric Railroad & Light Co. will invest the sum of P. 3,000,000, approximately, for the purpose of securing cheaper current for Manila and the suburban lines. This information has been received privately from New York and arose out of a discussion of the effect of the election of Woodrow Wilson on Philippine investments. The officials in New York have expressed their confidence in the immediate future of the Islands under the Democratic administration by declaring that they stand ready to instal a plant of the above character if the expert approves of the project in point of feasibility and increased efficiency in producing the juice.

The proposed site on the Caliraya River is distant about 60 miles from Manila. It has been considered most desirable in point of average flow of water and from its natural advantages as a location for an extensive plant to supply not only Manila but to accord Laguna and Batangas towns cheap light and power. Of course the expert will go into all the necessary details that the layman may overlook, but observations at that point for years indicate that the river would provide ample power, without interfering with the natural flow.

The construction will consist of a dam and runway with an outlet turning the water back into the river again. The initial unit installed will provide at least 33 per cent. more than is now necessary to supply light and power for Manila or 10,000 electrical h. p. with an efficiency in Manila of about 80 per cent.

CHINWANGTAO AND ITS FUTURE OUTLOOK

[By R. R. C.]



VIEW OF BREAKWATER FROM THE BLUFF

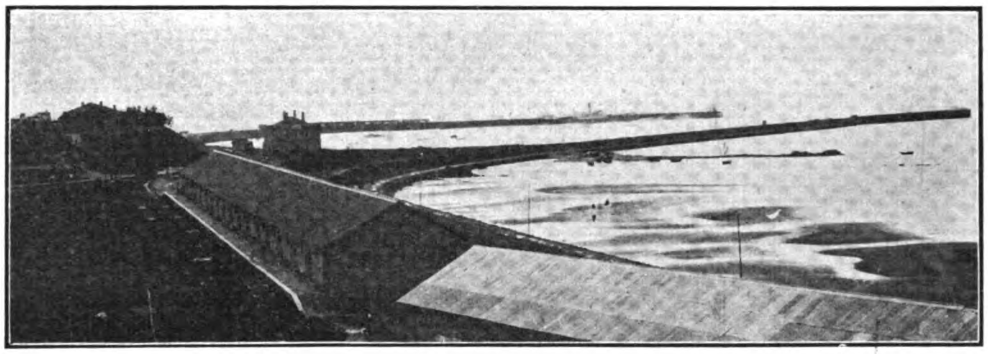
The composition of an article on Chinwangtao, though apparently a simple matter, is not unlike speculating upon the brood which will emerge from a sitting of eggs before our willing hen has had time to show what her incubating powers may be. In this case Chinwangtao represents the sitting of eggs; a kindly Fate takes the place of our willing hen; whilst a big busy port situated on the Western Shore of the Gulf of Liao Tung completes our analogy to show what Chinwangtao will some day surely become as soon as its period of incubation is over. We propose to speculate, if you will, upon the sea-port's rosy future. We are, fortunately, able to do this with some success owing to two causes which have combined to reduce its chances of failure to a minimum. One of these causes is so powerful that it has never been known to fail since the world began to spin. It has always acted, and it will continue to do so in the present as in the past; its name is Geography, for Chinwangtao is remarkably well situated from a purely geographical point of view.

The second cause is more local though none the less potential. Its potentiality lies hidden in the name of the Kailan Mining Administration. If we keep these two forces constantly before us, we shall see them constantly behind Chinwangtao, so that when we start cracking our statistical egg, we shall be able to digest it without an uneasy feeling. In a word we are convinced that Chinwangtao is going to blossom into one of the most important sea-port towns of North China, quite apart from any consideration of its sands or advantages as a Summer sea-side resort.

On these sands perhaps the word Blackpool will be written by the finger of Time some day, or may be our ears can already distinguish the new born cry of some mighty oriental Liverpool, bustling and busy, a centrifugal and centripetal force for the ships of the China Seas.

If Chinwangtao's proximity to the Mines, to the cornlands of Manchuria, and to the Government Railways of North China can not justify these rosy dreams, we know of no place in North China which can aspire to them, seeing that Chinwangtao is one of the few Northern ports which is not ice-bound and idle during the long, grey Winter months. Hitherto, we venture to think, the "Ping Line's" port has been more than a little hampered by one or two causes. Some of these are capable of immediate remedy. Others can only be removed by the healing hand of Time. Into this latter category we must put first of all the juxtaposition of Tientsin, which enjoys the advantage of being at the junction not only of the railways but also of the waterways of North China.

This juxta-position of the fast growing river port has certainly dwarfed the rise of the sea-port, and made it appear to the casual observer as though the latter were almost standing still. It is, however, the object of this article to prove the fallacy of that view, as well as to show by hard concrete facts that the rapid development of Chinwangtao is simply a question of time, plus judicious handling. Let us suppose that in the near future ocean going steamers should find it cheaper and more expeditious for them to go straight to Chinwangtao instead of stopping at Shanghai, will they not come to the Northern port? Let us suppose Chinwangtao takes advantage of its geographical position to sap from Newchwang the Southern import trade which passes Tientsin. In conjunction with the railway it could do so and will do so, but the railway is not going to come to terms until Chinwangtao compels it to do so by becoming more active through increased trade. This increased trade depends largely on the ability of the port authorities to attract more shipping. Then we shall see the railway offering in return some of the export trade — beans, etcetera — which of late years has left the country through Newchwang or Dalny.

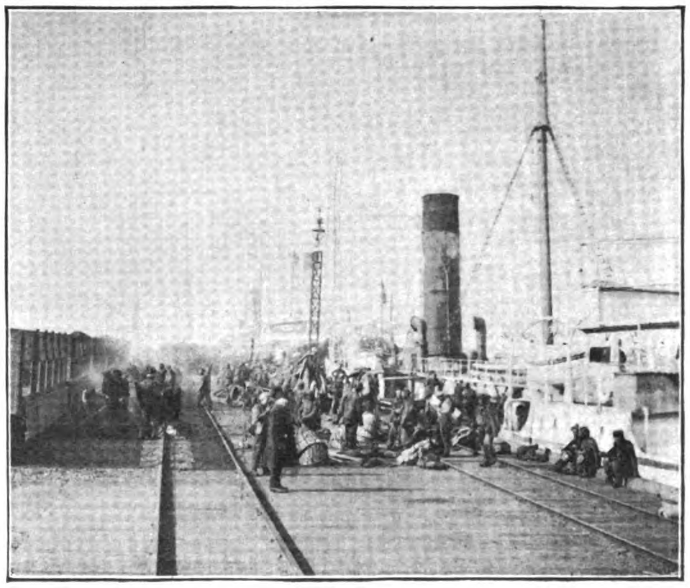


GENERAL VIEW OF BREAKWATERS FORMING THE CHINWANGTAO HARBOUR

Then we shall see Chinwangtao fulfilling some of the dreams we have already foreshadowed; for it now handles the entire traffic of the Mines which puts it in a very strong position, besides which it enjoys the extra advantage of coaling facilities superior to any other Harbour on the whole China Coast.

On the other hand some of the oil import trade has lately migrated to Newchwang, because the Standard Oil Company sells its oil cheaper there than at any other port; whilst the Manchurian grain export trade has never yet been attracted to Chinwangtao for the simple reason that there are no buyers on the spot there. This, no doubt, has been partly due to Chinwangtao having hitherto been a foreign-managed port instead of a Chinese-foreign managed port. In this connection I feel sure that every old China "hand" will bear me out in saying that for any big undertaking to succeed in China both Chinese and foreigners must be mixed up in it. The foreigner stops a leakage of expenditure; the Chinese greases the wheels. Neither can stand in China without the other's help, but together they become as creative as they are dynamic, of course, that is to say, as business men. Now the awakening of Chinwangtao will come about through interesting Chinese buyers and merchants in the port just as much as through attracting ocean going vessels to make use of its Harbour and piers, but every catalysis depends upon the introduction of the catalyst, and so it is impossible to prophecy exactly when the transformation from slow growth to roaring activity will take place in this ice-free Northern sea-port. When that good moment arrives Chinwangtao will presumably still have the double driving forces of the Kailan Mining Administration and of geography behind it.

It will become a residential place. Money will circulate in proportion as business people come to live within a three mile radius of its bustling quays. And, lastly, riparian Tientsin will find herself before very long making a curtsey to her Cinderella Sister of the Gulf of



LOADING COAL AT CHINWANGTAO WHARF

Liao Tung. These being our prognostications for the future, we suggest, gentle reader, that you accompany us, for a stroll down to the Breakwater and see what there is to be seen in Chinwangtao to-day.

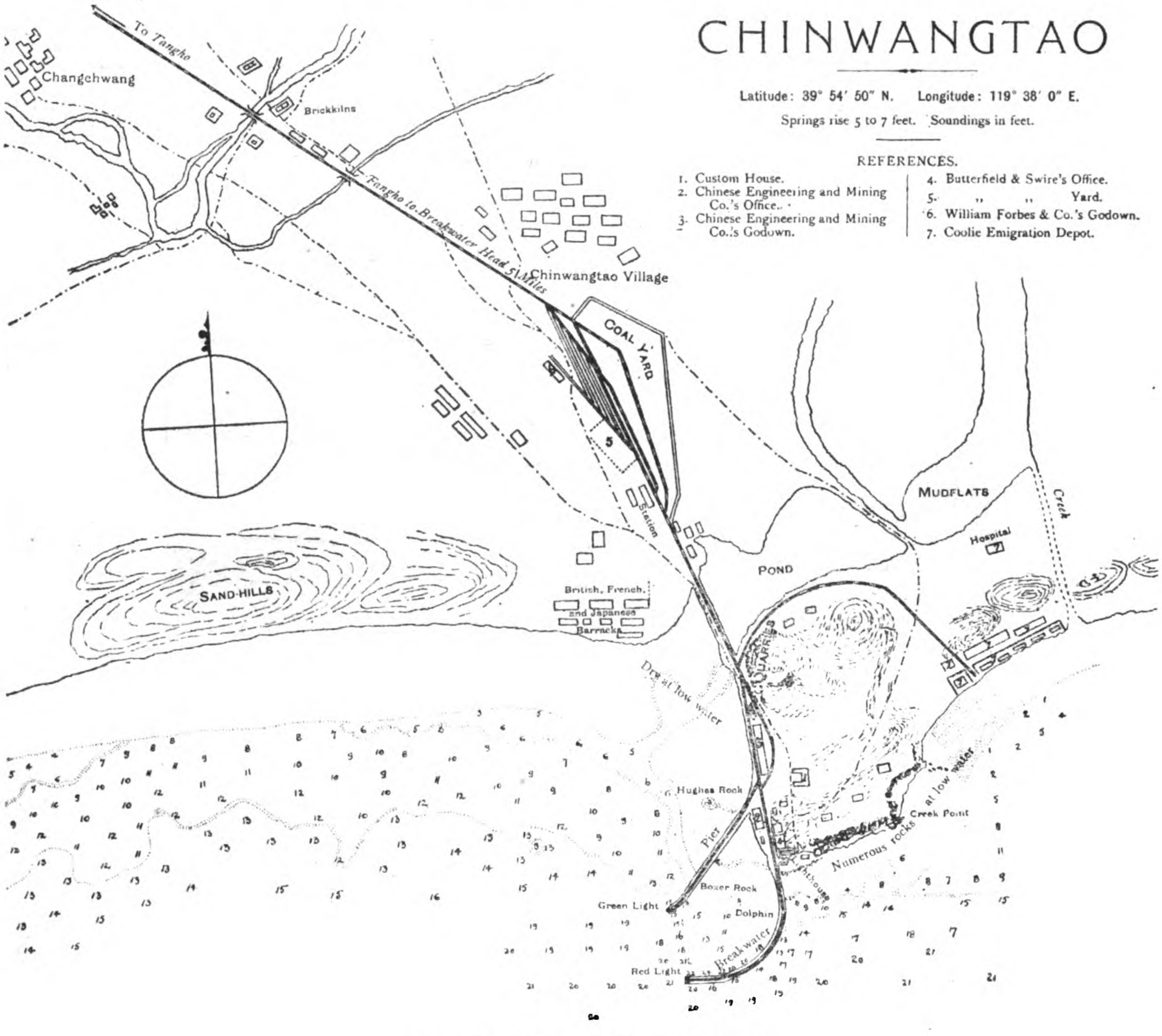
It is a raw cold morning in November, and amongst the other shipping we espy one vessel—a P. & O. flying the blue peter—which attracts our curiosity more than a little. It attracts us because we never expected to see it there, and because there is an air about it utterly unlike that of the three or four merchant steamers loading up with a coal or bricks or some other cargo for warmer Southern ports. It is a hired transport, and on hurrying towards her before she sails, we arrive just in time to say "good bye" to a regiment of British "Tommies" who are evidently very loth to turn their backs for ever upon the flowery land and upon the friends they made there. We wave our handkerchiefs. The vessel glides off. Then we turn to examine the breakwater upon which we are standing, and find it runs out first of all 650 ft., at right angles to the shore, after which it curves Westward to a radius of 750 feet, its extremity being 980 ft. long and tangential to this curve. The first 650 feet is a rubble embankment wide enough for two railway tracks laid to 14-foot centres. The remaining portion is a framed wooden structure with parallel rows of piles put down every ten feet at right angles to the centre line of the breakwater. On the inner side, steel joist piles, spliced to jarrah tops to form the superstructure, are spaced at 5-foot centres and driven down to rock through 16 feet of yellow clay, sand, and decomposed rock.

Immediately behind these piles we notice a number of 80 lb. steel rail piles driven along the face to retain the rubble stone-work which forms the hearting of the structure. The piles are braced together and form a strong support to the railway tracks which run along the top of the breakwater on stout longitudinal timbers. At the quay level this breakwater is 66 ft. wide. On the seaward side we notice it has a flat rubble slope covered with 5-ton concrete blocks serving doubtless as a protection against heavy gales. True, the work as a whole does not appeal very strongly to our aesthetic senses, but we feel nevertheless that it is durable, strong, and see that it is well equipped with cranes and trollies to ensure rapidity in loading any vessels which may take up their berths alongside.

Even as we stand watching, two or three vessels are unloading close at hand, whilst another is being loaded at the structure just across the Harbour which we rightly take to be the pier. From where we are standing it would seem as though this pier were constructed very similarly to the breakwater. It starts at a point 400 feet to the North West of the landward end of the breakwater, and projects out in a South Westerly direction into the sea. Between the breakwater and this pier the Harbour mouth is 907 feet across, and the area of water embayed between these two structures is altogether something nearly approaching 30 acres of smooth anchorage, safe for loading, safe for unloading, and very attractive to the storm-tossed skipper who has all but lost his ship,

We are quite satisfied with what we have seen so far, but at the same time we came out to ask questions, and are not prepared to go back to breakfast until we have gleaned all the information there is to be had. "I wonder what the bottom of the Harbour consists of?" we hear you ask as we gaze thoughtfully down at the sluggish grey November waters. We thereupon make inquiries and are told that the depth in the approaches is 22 ft. gradually shoaling to 20 feet at low water, whilst the sea bottom has all over it a layer of a foot or more of very soft mud. Beneath this layer of very soft mud there are various strata commencing with 5 feet of mud and yellow clay; then come 2 feet of stiff yellow clay and stones; then five feet of very soft clay and sand, and finally 2 feet 6 inches of decomposed rock and lime stone. Inside the Harbour the depth varies from 18 feet to 22 feet at low water, but the tides are weak and irregular, seldom exceeding half a knot per hour, whilst the rise of the tide is usually somewhere well between five and seven feet.

Our informant goes on to tell us that there is no necessity to make use of buoys because vessels can safely lie alongside the wharf and pier, as indeed we see for ourselves they are doing at this very moment. The only dredger employed is a small "Priestman's" Grab. This works for only nine months of the year—from the middle of March to the middle of



GENERAL PLAN OF CHINWANGTAO

December, and during this period the estimated quantity of material dredged is 3,500 cubic yards per month at a cost of about 21 Mexican cents per cubic yard. At present the breakwater can accommodate altogether five ships, the available space for berthing being as follows:—

Berth No. 3	for Vessls 275 ft. long	has 18 ft. at low water			
,, No. 4	,,	330 ft.	,,	20 ft.	,,
,, No. 5	,,	500 ft.	,,	21 ft.	,,
,, No. 6 & 7	,,	600 ft.	,,	21 ft.	,,

The pier, on the other hand is less commodious, and can only accommodate two vessels of 310 feet, one on its outer and one on its inner faces. These two berths are numbered respectly No. 1 and No. 2. They have each approximately 18 ft. at low water, but all the berthing places enjoy the extra advantage of a soft mud bottom so that vessels of even greater depth can face the possibility of grounding at low tide without fear of getting their bottom knocked out by hard, unsympathetic rocks.

However, even this assurance would seem hardly to satisfy the present energetic owners of the port, for they are now considering the possibility of effecting its improvement by dredging the Harbour approach to 23 ft., and by deepening the berths alongside the breakwater to 25 ft. at low water. Such a scheme will increase more than ever the facilities for berthing steamers promptly. The outer berths will then be occupied by ocean going steamers and worked independently without causing delay or inconvenience to vessels berthed in the inner ones. Then again the Harbour is so well protected that berthing operations can always be carried on in any ordinary weather.

"What then," we hear you ask, "is to prevent this place going ahead?"

Our answer is: "Nothing."

It is well situated midway between Mukden and Peking. Newchwang lies to the Eastward at a distance of 222 miles. Tongshan and Tientsin lie to the West: the former at a distance of 84 miles, while the latter is 165 miles away, measuring space by the only long distance measure left to us, by mobility, that is to say by the railway line.

Now we must wait for Chinwangtao to increase in importance and develop in proportion to the growth of factories and trade and industries along the whole Coastland from Taku to Shanhaikwan. Along that Coastland stretches the best coal field of North China. We all know from studying the development of other countries what wonderful powers coal possesses for incubating new industries, and for encouraging new factories. We all know equally well that Industry and Commerce go hand in hand. Therefore we say once more as we said before, the port of Chinwangtao is going to become not only the centrifugal but also the centripetal commercial force for the ships of the North China Seas, though how long the egg will take to incubate we cannot, at present, tell.

MINERAL RESOURCES OF THE PHILIPPINES

RETROSPECT FOR 1911

The Division of Mines, Bureau of Science, Manila, has issued a valuable report upon the Mineral Resources of the Philippine Islands for the year 1911, from which we take the following:—

The status of the mineral industry in the Philippines at the close of the year 1911 is more satisfactory both in metallic and non-metallic fields than at any time in the past. Extensive and careful investigation with conservative investment is the characteristic and most gratifying feature of the year's progress. Actual mining operation has been retarded by the typhoon of October, 1911, and by unsettled conditions in China, the residence of many investors in the Philippine gold and coal properties.

The statistics of the mineral production of the Philippine Islands for the calendar year 1911, and information concerning the different mining districts up to May 1, 1912, have been gathered through the coöperation of the mining operators and the bureaux of the Government. The annual reviews of the different mining districts deal primarily with the local progress, but are intended to bring out also the essential general features of the districts for the benefit of readers who are not familiar with Philippine mining.

SUMMARY OF THE MINERAL INDUSTRY

The production of minerals in the Philippine Islands does not show a marked increase over that of the preceding year, still there has been a steady advance in the industry. It has been proved beyond doubt that the Philippines are potentially rich in economic minerals.

The experience of the past year has shown more clearly than ever that one of the most serious handicaps to the Philippine mining industry is the difficulty in obtaining adequate capital.

Gold.—Progress in gold mining has been much interfered with by severe storms, but certain distinct advances have been made. Large companies have been formed and several new dredges are being built.

The first marked success in gold mining and milling has been attained at the Colorado mine in Masbate.

Iron.—In the iron fields of the Eastern Cordillera of Luzon, native mining and smelting continues as in past years. The existence of these magnetite and hematite deposits, together with the more promising one of hematite near Mambulao, Ambos Camarines, has caused considerable interest recently among capitalists, who are investigating the possibilities of these natural resources.

Coal.—The East Batan Coal Company mine has been in operation throughout the year. In Polillo development work is being done on two properties, one on the Guinibauan River and another on the Anabauan River. The arrival in Manila of the Otto gas-producer plant, ordered for the Bureau of Science and especially designed for utilizing Philippines coal, marks an event of importance in the coal industry here.

Cement, etc.—Several localities have been examined during the year by companies contemplating the manufacture of Portland cement. Complete field and laboratory investigations with burning tests have shown exceptionally favorable materials and locations. The increasing consumption of structural materials and road metal has resulted in a remarkable advance in the quarrying industry, while the manufacture of sugar *tenajas* and brick for sugar ovens by the native clayworkers has experienced unusual growth.

Some resources, the development of which is promising and which would greatly benefit the Philippine Islands, are the following:

(1) The Cebu, Sibuguey Bay (Mindanao), and Polillo coal fields.
(2) The manufacture of Portland cement.
(3) The manufacture of sand-lime brick.
(4) The iron deposits in Mambulao Bay, Ambos Camarines.
(5) The oil field of Tayabas.
(6) The manufacture of vitrified brick.
(7) The various sulphur and salt deposits.
(8) The asbestos deposits of Ilocos Norte.
(9) The lead deposits of Batangas Peninsula.

THE AROROY MINING DISTRICT, MASBATE

[By PAUL R. FANNING.]

The production of gold in the Aroroy mining district, Masbate, showed an increase from practically nothing in 1910 to 72,500 pesos in 1911. In 1910 no mills operated, while in 1911 the Colorado mill began operations and the Tengo mill resumed work for a short time.

The completion of the Colorado mill and the beginning of successful work in October, 1911, is one of the most important events in the history of mining in the Philippine Islands. This mine is now averaging 60,000 pesos per month, which if continued throughout 1912 will give a production of some 720,000 pesos, or over double the total gold output of the Philippines during 1911. There is reason to feel confident that this large production will be maintained for many years to come.

The production of companies is given in the following table:

Production of the Aroroy district.

Company.	Pesos.
Colorado Mining Co.	70,500
Tengo Mining Co.	2,000
Total	72,500

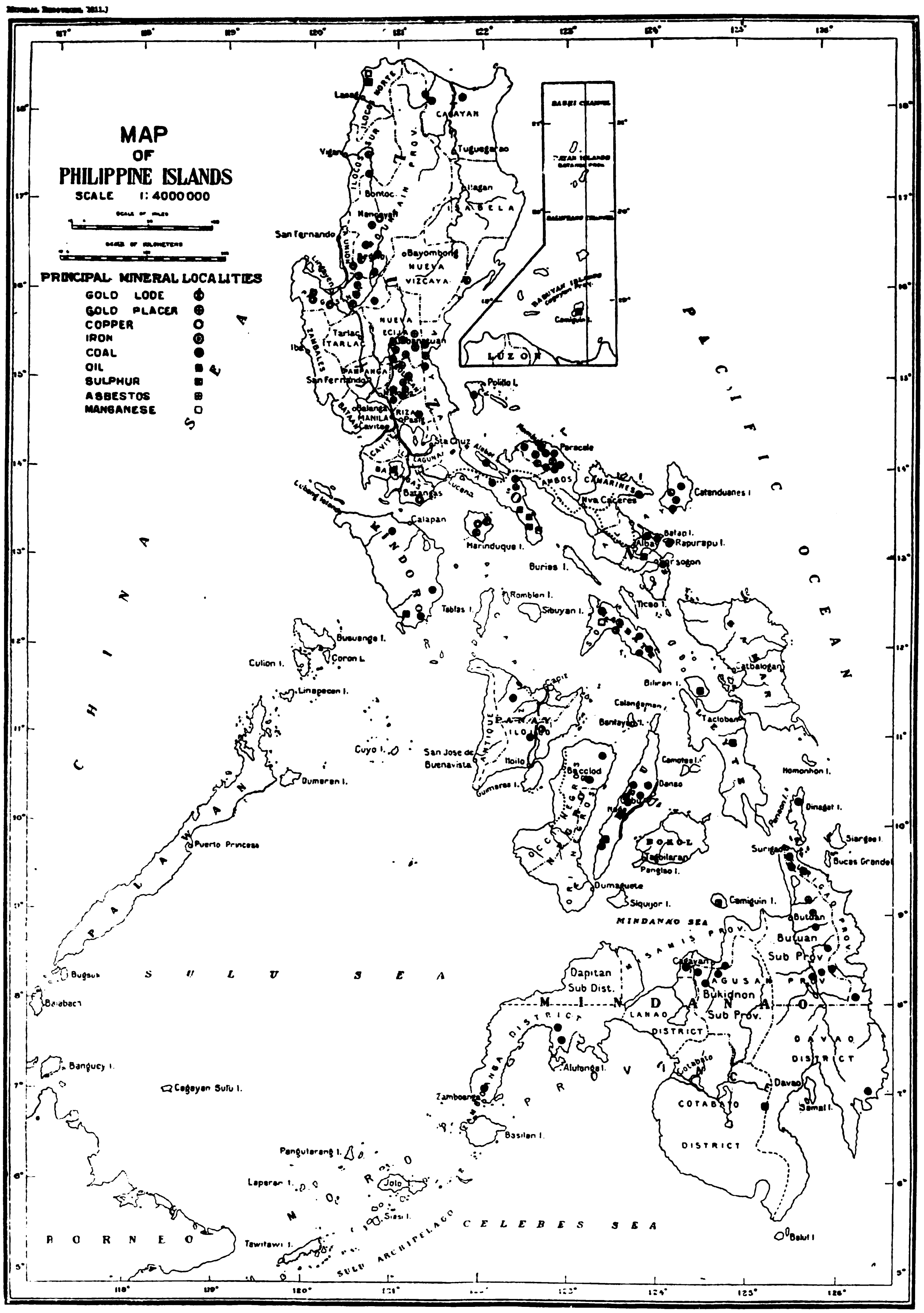
COLORADO MINING COMPANY

During the first part of 1911 the Colorado Mining Company continued active development work to prepare the mine for the 20-stamp cyanide mill which was nearing completion. During 1911 the mill operated irregularly for less than two months, but steady production did not begin until the last of December.

THE MINE.—The vein averages 4 meters in width, strikes south 45° east, and dips 70° to the northeast. The vein matter consists of quartz with some calcite and manganese. The ore is stated to average 20 pesos per ton.

The inclined shaft now reaches a depth of 146 meters, which is the greatest depth penetrated in the district, perhaps in the Philippine Islands. As stated by the company, the average values show only a nominal decrease from the top to the bottom of the shaft, and the bottom ore is said to have a value of more than 16 pesos per ton. It is to be noted that this ore is still above the level of the permanent groundwater, and hence in the oxidized zone. The indications are that the zone of oxidation should extend to a depth approximately equal to the level of the Guinobatan River; that is, 100 meters below the present bottom of the shaft. It is probable that pay ore will be found to this depth, and it is possible that the zone of oxidation may extend to an even greater depth. Whether or not a zone of enriched ore will be found at this depth is too problematic for present consideration, although the presence of manganese in the ore, as has been repeatedly pointed out, is highly suggestive of a zone of richer ore close to the level of the permanent ground-water.

The mine has been opened up by means of two main adits, 53 meters apart vertically; the upper, or No. 1, adit is 30 meters below the highest point in the outcrop. Two intermediate levels have been run, and various cross-cuts and up-raises put in. During 1911, a draft was run next to the hanging wall parallel to and connecting with No. 1; the main, or No. 2, adit was continued 80 meters farther to the northwest; the upper intermediate level was run for a distance of 120 meters; the lower intermediate level was run for a distance of 180 meters; and the shaft was sunk 30 meters



Reduced from Map of Philippine Islands by John Bach

MAP OF MINERAL DEPOSITS IN THE PHILIPPINES

to a total depth of 146 meters. In all some 800 meters of work was performed, besides preparing the ore bodies for stoping.

In stoping the ore, the square-set system of mining has been used, but owing to the high cost of timbering it is probable that some modification of the method will be adopted. The mine is surrounded by a forest of magnificent hardwood trees, but the cost of cutting, transportation, and dressing is very high. The shipment of dressed pine from the United States to supplant native timbers is being considered as an economical measure.

THE MILL.—The 20-stamp cyanide mill is of Traylor design and is of the all-sliming type, crushing in cyanide solution. The striking feature of the practice is that the gold solutions from the Dorr thickner pass to the zinc-boxes without filtering in the Oliver filters.

The ore is delivered from the second level of the mine to the storage bins, and thence to the mill by means of a 2-bucket aerial rope tramway 320 meters long.

Crushing.—The ore from the buckets passes to a 3 by 8 foot grizzly; the oversize is crushed in a 10 by 20 inch Blake crusher and passes to the bin. The ore is fed into four 5-stamp batteries by Challenge feeders. Lime, which is prepared in a kiln near the mine from a local deposit of calcite ore, is added at the batteries. The 20 stamps, weighing 1,250 pounds each, drop at the rate of 100 per minute; the height of drop is about 8 inches, and a 4-inch discharge is used. The ore is crushed in solution of a strength varying from 0.12 to 0.20 per cent. potassium cyanide. A capacity of 4.5 tons per stamp per twenty-four hours is obtained when a 6-mesh screen is used. The pulp, which has a thickness of about 6 parts of solution to 1 of ore, passes to a Dorr classifier where the sands are raked out and delivered to two 5 by 18 foot tube mills. These mills are of Traylor manufacture, with trunnion bearings and spiral fed. A speed of 28 revolutions per minute is used. The lining is of the El Oro type. At first Danish pebbles were used entirely, but at present some of the harder quartz from the mine is added. The discharged pulp, which contains about 40 per cent. moisture, passes to a bucket elevator and is returned to the Dorr classifier

Screen tests showed the following:

Screen Tests

Screen mesh.	Tube-mill discharge.	Classifier sands.	Classifier slimes.
	Per cent.	*Per cent.*	*Per cent.*
On 10	0.14	0.85	none
On 20	1.53	10.05	none
On 40	8.52	19.50	none
On 60	31.29	25.55	none
On 80	19.33	14.85	none
On 100	15.32	12.25	none
On 150	7.55	5.70	6 to 12
On 200	5.80	0.65	8 to 16
(–) 200	10.52	63.00	remainder

It can be seen that the classifier collects 63 per cent. of (–) 200-mesh product along with the sands. This is poor classification and results in extra tube-mill work. However, the advantage of using a classifier, which delivers a thick product for the tube-mill, compensates somewhat for this disadvantage.

Treatment of the slimes.—The slimes, having a thickness of about 9 to 1, pass from the Dorr classifier to a 20 by 14 foot Dorr thickener. The overflow from the thickener passes to a clarifying tank, thence to a gold-solution tank, and thence to 3 sets of 7-compartment zinc-boxes.

The pulp from thickener passes to two 12 by 40 foot Pachuca tanks connected in series. The central columns of the Pachucas discharge at the surface, and an air pressure of about 32 pounds is used. The solution has a strength of from 0.12 to 0.20 per cent. potassium cyanide, and the pulp has a thickness of about 1.5 to 1. After agitation in the Pachucas, the pulp passes by launder to a second Dorr thickener. Previous to entering the thickener, the pulp is diluted with solution from the Oliver filters. The overflow from the thickener passes to a clarifying box, and thence to 2 sets of 7-compartment zinc-boxes. When first operated the thickeners gave trouble owing to the great amount of slimy foam which overflowed with the gold solution. This difficulty was overcome by removing alternate bolts on the rim launder and drawing off the solution just below the surface free from foam. The foam is drawn off separately by a central launder and passes to the Traylor agitator.

The pulp from the thickener passes to a 20 by 8 foot Traylor agitator, which prepares the pulp for two 11 by 6 by 8 foot Oliver filters. From the filters the gold solution passes by means of wet and dry vacuum pumps to a 12 by 10 foot storage tank. From here part of the solution is pumped to dilute the pulp entering the second Dorr thickener, and the remainder is relayed to the 28 by 14 foot solution storage tank at the top of the mill. None of the solution from the filters passes directly to the zinc-boxes.

Solution of the gold.—As noted, a feature of the practice is that the gold solution is taken from the Dorr thickener for precipitation rather than from the Oliver filters. The reason for this lies in the fact about 80 per cent. of the gold goes into solution before the pulp reaches the Pachucas. It would seem from this that the greater part of the gold is very fine, easily liberated, and readily attacked by the cyanide solution. The presence of manganese probably has been instrumental in producing this condition of the gold. Some coarse gold and gold bound up in the minerals are present, and the Pachucas give the added time necessary for their solution.

Precipitation and clean-up.—A general clean-up is made every two weeks, and the bullion is melted once a month. The zinc fines are treated with sulphuric acid, and the gold slimes

STATISTICS OF PRODUCTION.

TABLE I.—*Mineral products of the Philippine Islands for the calendar year* 1909-1911.

[Values in pesos[1] Philippine currency.]

Products.	1907	1908	1909	1910	1911
Metals:					
Iron	([2])	[3]17,500	[3]31,078	[3]20,023	[3]29,150
Silver[4]	97	2,750	....	....	....
Gold	187,647	434,500	495,194	308,860	379,906
Copper	....	52	....	....	600
Manganese	....	....	12,500	....	([5])
Total value of metals	187,744	454,802	538,772	328,883	409,665
Nonmetals:					
Coal	26,709	77,166	197,184	176,255	[6]130,000
Clay products	([2])	421,628	422,840	430,000	450,000
Lime	([2])	20,000	60,656	70,000	90,000
Sand and gravel	([2])	206,360	325,050	293,456	477,344
Stone	([2])	146,930	311,177	372,575	655,795
Salt	([2])	([2])	375,368	380,000	550,000
Total value of nonmetals	26,709	875,084	701,275	1,722,286	2,353,139
Grand total	214,543	1,329,886	2,240,047	2,051,169	2,762,804

[1] One peso Philippine currency is equal to 50 cents United States currency.
[2] Statistics not available.
[3] Value of manufactured product, 73.0 metric tons of metallic iron.
[4] Some silver is generally found alloyed with Philippine gold: none is mined separately.
[5] No production reported for 1911, but the known deposits are receiving careful attention.
[6] 20,000 metric tons at 6.50 pesos per ton.

TABLE II.—*Comparative statements of the gold production by provinces for the calendar years* 1907-1911.

[Values in posos[1] Philippine currency.]

Province.	1907	1908	1909	1910	1911
Ambos Camarines	4,133	143,532	216,701	144,900	198,000
Mountain Province	160,699	278,474	256,400	95,960	66,406
Sorsogon (Masbate)	22,815	1,330	....	....	70,500
All other provinces	....	11,164	22,093	68,000	45,000
Total	[2]187,647	434,500	495,194	308,860	379,906

[1] One peso Philippine currency is equal to 50 cents United States currency.
[2] The total gold production for 1907 has been erroneously stated as 141,194 pesos in the past.

are washed, steam dried, and melted in a gasoline, tilting, crucible furnace. The bullion is shipped to Manila, where the International Banking Corporation advances value based on the company's own assay. The bank ships the bullion to San Francisco, and later makes adjustments with the company.

Cost of operation.—The cost of mining and milling at the Colorado Mine has been placed at less than 8 pesos per ton, and there is some reason to believe that this figure will be reduced under the conditions of steady operation. The fact that the cost of mining is moderately low would lead to the belief that, considering his low salary, the Filipino is an efficient miner. It is to be remembered, however, that the vein is of such width as to permit stoping on an economical scale. Furthermore, most of the ore is sufficiently soft and fractured so as to be readily mined without the use of dynamite. On the other hand, the cost of general supplies is somewhat high, although lower than at many mines in the United States not situated directly on a railroad. The anomalous condition of having a timber problem in the midst of a great forest has already been discussed, and this problem will become more acute as the more adjacent trees are removed.

Owing to the excessive cost of the mill, the original investment is very large in comparison with the capacity, and this means a higher cost per ton than usual owing to the factors of depreciation and interest. For this mill these two factors alone mean a cost of about 1 peso per ton, and it is possible that this amount has not been included in computing the total cost of operation.

It was the belief of the writer when first coming to the Philippines that the depreciation for this country would be especially high, and experience in many cases has justified this belief. However, there are instances where, under good construction, the depreciation has been no greater than in the United States. The destruction of buildings under the attacks of white ants or other insects does not always seem a serious consideration, as there are numerous buildings, properly constructed, which have lasted, for many years; certainly many years longer than the probable life of any mine. It is also known that white ants do not attack timbers which vibrate under the shocks of machinery. The construction work on the Colorado mill is of such order that it appears unnecessary to allow an excessive depreciation charge.

The Eastern Mine.

The Syndicate Mining Company which holds a bond and lease on the Eastern Mine continued active development work throughout 1911, and by the end of the year had greatly increased the actual ore in sight. The workings of the mine, and the character of the ore, have already been accurately described, and as stated by Eddingfield, the mine "presents a possibility of having over 100,000 tons of ore averaging 9 to 10 dollars per ton."

The development work has now reached the stage where it would seem that the erection of a mill is warranted. In conformity with this plan, a sample of ore was submitted to the division of mines, for testing, and the results obtained were most encouraging. Through the kindness of Judge Geo. N. Hurd the results of these tests are here given in brief.

Tests on Eastern Ore.

The ore.—The ore consists of quartz and calcite with some manganese (wad, oxides, etc.). Sulphides are sub-ordinate. The value of the sample is 54 pesos per ton.

Amalgamation test.—At 20-mesh, 16.4 per cent. can be saved by amalgamation where stamps and outside plates are used.

Concentration test.—At 20-mesh the ratio of concentration was 100 to 1. There appears no benefit nor object in concentration on this type of ore.

Cyanidation tests.—At 20-mesh, division was made into sands and slimes, and the slimes showed a high extraction. With the sands only a moderate extraction was obtained.

Table A

Cyanide-tests on sands and slimes.

Products.	Assay heads	Assay tails.	Extraction.	Time.	Strength of solution	Consumption per ton of ore.	Method.
	Pesos.	*Poses.*	*Per cent.*		*Per cent.*	*Pounds.*	
Sands	50.84	24.00	55.5	2 days	0.09	0.8	Leaching.
Sands	50.84	15.90	70.4	5 days	0.28	1.0	Leaching.
Slimes	76.06	6.70	88	12 hours	0.26	0.8	Agitation.

Table B

Fine-grinding cyanide tests—ore through 100-mesh.[1] (*Showing effect of time.*)

Assay heads.	Assay tails.	Extraction.	Time,	Ratio of solution to ore.	Strength of solution.	Consumption per ton of ore.
Pesos.	*Pesos.*	*Per cent.*	*Hours.*		*Per cent.*	*Pounds.*
54.00	13.60	74.4	1	1 : 1	0.28	0.5
54.00	10.00	81.5	2	1 : 1	0.28	0.8
54.00	6.60	87.7	4.5	1 : 1	0.28	0.8
54.00	6.60	87.7	6	1 : 1	0.28	0.8 •
54.00	6.20	88.4	16	1 : 1	0.63	0.8

Fine-grinding cyanide tests—ore through 100-mesh.[1] (*Showing effect of thickness of pulp.*)

Assay heads.	Assay tails.	Extraction.	Time.	Ratio of solution to ore.	Strength of Solution.	Consumption per ton of ore.
Pesos.	*Pesos.*	*Per cent.*	*Hours.*		*Per cent.*	*Pounds.*
54.00	6.60	87.7	22	1 : 1	0.28	0.8
54.00	4.24	92	22	2 : 1	0.26	0.8
54.00	4.00	92.6	22	3 : 1	0,26	0.8
54.00	3,20	94	22	4 : 1	0,26	0.8

[1] The ore was agitated in bottles, and in all cases lime was added.

Screen Test at 20-Mesh.

Products.	Weight.	Gold.	Assay.
	Per cent.	*Per cent.*	*Pesos.*
20-mesh original....	100	100	54.00
On 100-mesh........	80.2	73.37	50.84
Through 100-mesh..	19.8	27.72	76.06

This test shows that when crushing through 20-mesh, approximately 80.2 per cent. can be considered as sands and 19.8 per cent. can be considered as slimes. As is so generally true, the slimes assay considerably higher per ton than do the sands, although the slimes actually contain only 27.72 per cent. of the gold.

Where the ore is crushed through 20-mesh and divided into sand and slimes the following was shown:

(*See Table A*)

It is apparent from this table that a much better extraction can be obtained on slimes.

The ore was next put through 100-mesh by means of a tube-mill and the following tests were made:

(*See Table B*)

As shown by the first table, the extraction increases from 74.4 per cent. in one hour to 87.7 per cent. in six hours. Further time increases the extraction only a slight amount. As shown by the second table, the extraction increases from 87.7 per cent. in a 1:1 pulp to 94 per cent. in 4:1 pulp.

To ascertain the effect of amalgamation previous to cyanidation, a split of the same tube-milled sample was amalgamated and showed 44.4 per cent. extraction by amalgamation. The tailings were then cyanided without further crushing and showed 95.4 per cent. extraction in twelve hours where the strength of solution was 0.26 per cent. KCN and the ratio of solution to ore was 3:1. The consumption in this test was 0.4 pound of cyanide per ton of ore. The conclusion is that amalgamation previous to cyanidation will give a greater extraction in the same time; or, in other words, will give the same extraction in less time

The ore was next put through 150-mesh by means of a tubemill, and cyanide tests gave the following results:

(*See Table C on page 316*)

As shown by this test from 94 per cent. to 96.6 per cent. extraction can be obtained when the ore is put through 150-mesh, whereas about 90 per cent is obtained under the same conditions when the ore is put through 100-mesh.

Table C

Fine-grinding cyanide tests—ore through 150-*mesh.*

Assay heads.	Assay tails.	Extraction.	Time.	Ratio of solution to ore.	Strength of solution.	Consumption per ton of ore.
Pesos.	*Pesos.*	*Per cent.*	*Hours.*		*Per cent.*	*Pounds.*
54.00	3.20	94	12	2 : 1	0.26	1.6
54.00	1.82	96.6	12	2 : 1	0.26	1.2

It is evident from these tests that the ore is well adapted to cyanidation where the all-sliming process is used. It has been shown that greater than 90 per cent-extraction can be obtained, that the time required is moderate, and that the consumption of cyanide is low.

In view of the tonnage developed and of the high extraction possible with a suitable mill, it would seem that this mine is in a position to command the capital necessary for the erection of a plant.

OTHER PROPERTIES.

The Tengo Mining Company did a little development work and operated the mill for a few days during which some 2,000 pesos worth of gold was recovered by amalgamation alone.

It is now fairly well established that the ores of the district require a large outlay of capital before successful production can begin, and the splendid returns from the Colorado mill will undoubtedly make the securing of capital a far easier task in the future than it has been in the past.

THE PARACALE DISTRICT,

[By F. T. EDDINGFIELD.]

Gold dredging seems to have fulfilled the prediction made last year by Fanning. The gold produced by dredging in 1911 shows an increase of about 50 per cent. over 1910 and an increase of 16 per cent. over the entire production of the district in 1910.

Gold production.

[Values in Philippine currency.]

Years.	Dredging.	Quartz mining.
	Pesos.	*Pesos.*
1910	128,505	43,395
1911	198,000	....

During the year 1911 the Stanley dredge, the Tumbaga Mine, and the San Mauricio Mine were not operating, so the entire production has come from the Paracale dredge and the one on the Maliguit River operated by the Heize Dredging Syndicate.

The Paracale Bucket Dredging Proprietary, Limited, backed by Australian capital, has been organized to take over the property of the Paracale Gold Dredging Company. They have continued operating the old dredge and have started building a much larger one, which is to be of the close-connected type with buckets of 5 cubic feet capacity. It will be operated without a screen in accordance with the latest Australian practice. The buckets dump into a box into which a strong jet of water is played to break up the cemented sand and clay. From the box all the material flows over the tables. It is claimed that the clay and cemented sand is further broken up by the bumping and grinding action as the material passes over the riffles.

Several dredges in Australia, which were unable to pay dividends while using screens, proved very profitable when the screens were removed and the entire material allowed to flow over the tables. With this modification it is said that the dredges handle more material and save more gold.

The pontoon for the new Paracale dredge is being built of native hardwood cut and sawed on the property, the two classes of wood used being *malapajo* and *palansalan*. The latter wood is said to be remarkably good for under-water service. Rough calculation shows that this wood can be obtained for about 35 pesos per 1,000 board feet

The dredge at present working at Paracale digs up each day several tons of quartz fragments, many of which contain visible gold. These are sent to a mill built on the south side of the river. At the mill the ore is crushed partly by hand, then run through a small jaw-crusher, and elevated by a bucket conveyor to the ore bin. From the bin the ore is fed into a 5-foot Huntington mill and thence passes over amalgamation plates. The tails are concentrated on a shaking table and the concentrates are shipped to Australia. The quartz is so hard that difficulty is encountered in crushing with this machinery. A larger crusher followed by stamps would prove a good installation.

A dredge is also being built by the Philippine Exploration Company at the Gumaus property. This is a 5.5-cubic-foot Empire steam-driven dredge with wood hull and framing designed by the New York Engineering Company. It is of the close-connected bucket type with screens and stacking ladder and will be held against the working face by "spuds," one steel and one wood. The pontoon is made principally of pine. It will be interesting to compare the durability as well as the efficiency of this dredge with the new dredge of the Paracale Bucket Dredging Company.

The Gumaus property is not very heavily wooded, and it is not improbable that wood for fuel will be somewhat expensive. The ground is said to average 1.04 pesos per cubic meter and vary in depth from 8 to 20 meters. The gold in this deposit differs from the Paracale gold in being generally in rounded grains showing practically no crystallization. It is light yellow, and seems to be singularly free from iron stain. There is also more uniformity in the size of the grains and a smaller percentage of fine gold.

Since the closing down of the San Mauricio and Tumbaga Mines, the majority of prospectors have left Paracale for other fields. However, Mr. La Duc has been working steadily on the Navotas group and has sunk several shafts on small stringers. The main shaft is of 2 compartments, well timbered; a bucket running on guides is used for hoisting. A good head-frame has been erected over the shaft and a Mundy hoist has been installed. It was reported that the stringers though small are very rich in gold. The property is situated almost directly west of Paracale and can be reached from there in about one and one-half hours.

Southwest of Paracale, on Mount Togas, are a large number of veins striking northeast and southwest. They show evidence of having been extensively worked in the past by natives. Two years ago Mr. Samoza worked an *arrastra* at this place for a short time. Mr. Lafferty is now prospecting these veins and has uncovered some good-looking deposits. Rumor tells of an exceedingly rich vein in this section which the old natives called the *Insic* (the Tagalog word for Chinaman) lead, because the gold in the ore is shaped almost like the Chinese eye. It is not impossible that this vein exists, as well as other rich ones, for the district of Paracale has never been properly prospected. Prospectors have been generally content with opening up the old native workings and doing little new work.

The Heize Syndicate is still operating successfully with a dredge on the Malaguit River, and steps are being taken by the Stanley Company to put their dredge in working order.

THE BAGUIO MINERAL DISTRICT IN 1911

BY WALLACE E. PRATT

The Baguio Mineral District, located near the City of Baguio in the Subprovince of Benguet, has been discussed each year in the Mineral Resources of the Philippine Islands and has been the subject of several articles in the Philippine *Journal of Science.* All the available data on the geology and ore deposits may be found in the articles cited in the footnote. The gold ore of this district is classed as generally low grade (10 to 20 pesos per ton) with irregular and local high values. The prevailing rock has been shown to be andesite. The veins are usually true fissure veins, with subordinate contact deposits between andesite and diorite and between andesite and sedimentaries. Quartz, calcite and manganese characterize the vein material.

In October, 1911, the Baguio district suffered the severest typhoon in its history. New mills were severely damaged, and in some cases destroyed, on properties which had already suffered the loss of mills and other property through earlier typhoons. Mine roads were obliterated by land slides, and high water cut off all communication with Manila. While this damage was a severe blow to the district and curtailed the annual production, yet the confidence of the operating companies in the ultimate value of their properties is unshaken, and the recovery of the industry is already becoming evident.

That typhoons and the resulting floods are factors which must be taken into account in mining practice in the Philippines has already been pointed out. The typhoon factor in the Baguio district is recognized by the experienced operators as extremely important and it will be given greater consideration as the district develops. Already there is a tendency to avoid the lowest terraces along the Antamok River in locating new mill sites. The older mills were built on these lower terraces, on account of the favorable steep slopes obtained, but it is probable that future mills will be located higher above the river bed, even at the expense of less favorable slopes and longer pipe lines for water power.

The gold production for the Baguio district in 1911 amounted to 66,406 pesos as compared with 95,960 pesos in 1910, 243,500 pesos in 1909, 270,600 pesos in 1908, and 155,520 pesos in 1907. The Headwaters, the Benguet Consolidated, the Major Mines, and the Camote-Clayton have contributed to the year's production.

The Camote-Clayton on the lower Antamok River is equipped with a 3-stamp battery and plates for amalgamation. Mr. Reavis, who is in charge of the property, has recently made an attempt at cyanidation; the tailings from the plates are sent to an improvised classifier and the sands from this to leaching tanks, whence the solution is decanted to zinc-boxes for precipitation. Power for the mill is supplied by an overshot waterwheel made on the property, water being brought down in an open flume from about 200 meters up the river. The ore comes to the mill by gravity by means of a small aerial tramway. Underground, Mr. Reavis has continued development to supply the ore milled. The vein being worked, is a calcite-manganese vein, 8 to 15 meters wide in a contact zone between andesite and diorite. There is a tendency toward banded structure of calcite and manganese. The milling ore is largely calcite, much blackened by manganese oxides, with occasional patches of lighter colored quartz, apparently less contaminated with manganese. Recent development encountered ore carrying visible gold at a point 14 meters below the lowest former workings. In the

specimens exhibited, considerable free gold and some malachite can be seen in an otherwise typical ore.

On the Major group of claims, located on a tributary of Gold Creek (Gold Creek and Antamok River are roughly parallel, separated by a high, narrow ridge, and together drain the area adjacent to the principal mines of the district), a 6-stamp Hendy mill operated during the early months of 1911. An unusually large number of veins have been found on the property, characterized, according to Smith and Eddingfield, by pyrite sometimes accompanied by galena and copper sulphides, in a quartz gangue. Ore with visible free gold has been noted in some of the veins. The veins occur in andesite and sedimentaries, possibly a result of contact phenomena.

The Benguet Consolidated is located on the Antamok River and is the oldest property in the district. It was damaged beyond operation by the flood in October, 1911, which destroyed the pipe line for water power. The cyanide mill had been destroyed by the flood of October 1909, and in the interim the stamp mill had been run under difficulties, the tallings from the amalgamating plates going to waste. The Consolidated has developed a large tonnage of ore and is considered to have a valuable asset in its possible ore reserves.

The Headwaters Mine, located on the upper part of the Antamok River, was operated only a few months after the completion of a new cyanide mill in 1911 when it was forced to close down by the flood in October. The following notes concerning the first operation of the Headwaters mill were obtained by Mr. P. R. Fanning of the division of mines, through the courtesy of Mr. F. L. Cole, who was in charge of the mill at that time.

The ore was trammed by hand from the mine to the mill, where it was passed over grizzly bars and through a Blake jaw crusher to the mill ore-bin. From the bin the ore was fed to a Hendy 10-stamp mill by Challenge feeders. The stamp-mill product was classified by an 8-foot Callow conical classifier from which the slimes went to a slimes collector and the sands to a Hardinge conical tube-mill, followed by a double cone classifier from which the slimes went to the collector and the sands were returned to the tube-mill by a Frenier sand-pump. The slimes from the collector were agitated from eight to sixteen hours in 2 Pachuca tanks, and then passed through 2 conical collecting tanks to a Ridgway filter. The solution from the filter went through a gold-solution tank to zinc-boxes from which it went to the sump for return to the head of the mill. The precipitated values were cleaned by acid and smelted to bullion in a gasoline pot-furnace. Owing to difficulty in the operation of the Ridgway filter, it was cut out of the process and the gold solution was decanted directly from the conical collecting tanks to the gold-solution tank. The collecting tanks used as decanters were fitted with filter bottoms, consisting of boards perforated with 1-inch holes, covered with burlap, coco-matting, and light drill sheeting.

In usual practice the ore was crushed in cyanide solution averaging 0.05 per cent. potassium cyanide. Cyanide was added in the collector to bring the strength of solution up to 0.15 per cent. potassium cyanide. To neutralize the varying acidity of the quartz-calcite-ore from 5 to 20 pounds of lime per ton of ore were required. The capacity of the mill was from 60 to 70 tons per twenty-four hours with the stamps dropping at the rate of 100 per minute. Running at this capacity on average ore with the stamps crushing through 12-mesh and the tube-mill reducing the pulp until 95 per cent. of it passed 100-mesh, the treatment recovered 90 per cent. of the gold values. Power is supplied by a 6-foot Pelton wheel with a 100-foot head of water, supplemented by 2 gasoline engines of 15 and 25 horsepower respectively. Water for power is obtained by means of a diversion weir across the river about 500 meters above the mill and an 18-inch steel pipe line with a pressure box at the mill-site.

In March, 1912, the Headwaters Mine resumed operation under the management of Mr. Phillipson, of Bagmo, with Mr. W. D. Power supervising the mill and the mine. Through the courtesy of these gentlemen the following data were obtained concerning the first cleanup.

Tons of ore treated	400
Hours of mill operation	178
Per cent. of extraction (approximately)	90

Value of cleanup:	Pesos.
Gold	6,551.58
Silver	87.52
Total	6,639.10

Mr. Power made no attempt to use the Ridgway filter because of its extreme complication. Satisfactory results were obtained by decantation since the slimes settle rapidly. The ore for this run was considered to be representative of the average Headwaters ore in gold value. The mill is handicapped by insufficient power on account of the low stage of the river. It is planned to replace the gasoline engines by one of 50 horsepower. The present management is storing a quantity of supplies sufficient to permit the operation of the mine throughout the approaching wet season, in anticipation of the interruption of communication with Manila by floods.

The Bua Mine in the Antamok Valley, and the Muyot Mine and the Kelley Mine both in the Gold Creek Valley, are all properties on which extensive development work has been done. On the Bua, a Hendy 6-stamp mill has stood idle since October, 1909, when floods destroyed the flume which carried water for power and damaged the mill considerably.

Neither the Muyot nor the Kelley properties have installed mills. The Kelley Mine has opened up 5 separate veins which are partially developed by drifts and crosscuts. The ore is a pyrite-bearing quartz, and gold as a telluride has been reported. The veins are not all parallel and the resulting intersections and branchings suggest an irregular vein system or fracture zone.

On a number of other claims in the district, the annual assessment work has been done as usual. From the Bonanza group, east of the Headwaters Mine, ore containing visible free gold was encountered in recent development work.

CANSURAN MINING DISTRICT

[By F. T. Eddingfield]

Location

The Cansuran Mining district is located about 10 kilometers south of Surigao, Mindanao, near the center of the Peninsula of Surigao. The district extends from a little beyond Mounts Canmajat and Binutong north-easterly to the Surigao River, comprising principally the area between the Biga and the Tungunaan Rivers which flow into the Surigao.

History and Development

It is said that over thirty years ago an Englishman operated in the district for a short time. About the year 1885 a Spaniard, Ricardo Gonzales, obtained a concession by which he controlled all the water rights of the district. He did no mining himself, but granted water rights to the natives for 25 per cent. of the gold produced, with the privilege of buying at a very low figure all of the gold which they obtained. Since that time the natives have worked whenever sufficient water could be obtained for sluicing.

While the methods employed by the natives were very crude, they were able to recover a large percentage of the gold from the gravels. They carried water, sometimes several hundred meters by means of flumes made from the bark of trees, the most durable flumes being made of *palma brava*. Even a very small stream of water enabled them to do very extensive work. The water was led to the top of the face of the gravel to be worked and allowed to flow down it. The gravel was loosened by bars or shovels and was washed down through a narrow trench, which in places had to be cut through the bed rock. The light material was allowed to wash away, but the gravel, which accumulated in the trench, was raked and picked by hand and finally thrown up on one bank with coconut shells. The boulders were piled on one side of the trench, forming a wall which retained the waste. Boulders too large to be moved by hand were drawn out or to one side by means of a rattan rope which wound upon a post set vertically, guyed firmly with rattan, and fitted with one or two horizontal arms. Boulders too large to be moved in this manner were left in place and worked around. At regular intervals the concentrates in the bottom of the trench were panned to recover the gold.

In places where water could not be obtained, tunnels were driven along the bed rock and the rich gravels were carried down to water and panned. Some of these workings are very extensive, undermining large areas.

The cuts made by the natives give an excellent idea of the extent of the workable ground and of its value. The average miner can earn over a peso a day, when only two or three work together. When a large number work together, even better earning is reported.

Character of the Deposit

The gold occurs as placer and is unusually coarse for the Philippine Islands; many nuggets have been found weighing over 30 grams each. The great majority of the gold as brought in by the native workmen would not pass a 30-mesh screen and a large amount would be caught on a 10-mesh screen. The grains are for the most part well rounded showing considerable movement, except on Tagbasingan and Canmajat Mountains where crystallized gold, often wire gold, is found which apparently has not been moved far. The workings on Canmajat are said to be in quartz and the gold to be panned from crushed rock taken from a vein which cuts across Canmajat, striking almost north and south. The average gold in the district runs about 790 fine in gold and 200 in silver.

The gold in the southwestern part of the property, that portion which is made up of high hills and ridges, is found in gravel beds from 3 to 10 meters thick. These beds cover the hills and ridges almost uniformly and have the appearance of being deposited by one or more old rivers. They are made up of coarse and fine gravels. Boulders weighing several tons are common, and boulders weighing from 10 to 100 kilograms each are very abundant. Most of these, probably 90 per cent.; are andesite, others are schist, diorite, and red felsite. In the northwestern part along the Cansuran River some quartz pebbles were found, but the greatest part of the deposit contained no quartz pebbles of any size.

These gravel beds must have been the deposits from old rivers which washed the gold of the quartz veins and stringers from the formation which at that time covered the present surface. This old formation with its gold bearing veins and stringers has been mostly eroded and the present hills once formed the valleys in which the alluvium was deposited. The unusual distribution of the alluvium, covering the hill sides as well as their crests and also covering the depressions between hills, would tend to indicate that an uplift had taken place irregularly throughout the district and that the old river beds had been raised above their former positions. The character of the bed rock affords no conclusive evidence supporting this theory, although the northeastern part has undergone great compression stresses producing schists and much-folded shales. This was done previous to the deposition of the alluvium and consequently did not affect it.

The highest peaks in the district, Canmajat and Tagbasingan, are said to contain quartz veins rich in gold.

The uplift of the district must have been more or less general over the entire peninsula, raising at the same time the limestones of the northwestern and eastern coasts. During the period following the uplift the erosion must have been very gradual as shown by the fact

that a large part of the alluvium is in place. The heavy forests, which now cover the district must have sprung up during this period and subsequently served to hold the loose gravel in place. About a meter or more of soil covers the gravels proper. This soil was produced by the decomposition of the gravels as attested by the fact that it carries gold even within a few centimeters of the surface. The gravels below are somewhat weathered and partially cemented in places and contain gold values throughout, although the richest portions are found in certain beds and streaks which generally, although not universally, lie next to the bed rock.

Value of the Deposit

The present owners of the property have built a flume which carries water from a branch of Cansuran Creek to a reservoir situated about 50 to 60 meters above their present workings. From this reservoir water was obtained for operating a sluice and it is reported that the ground worked at this point averaged about 5 pesos per cubic meter. This was said to be an exceptionally rich area. On any piece of ground where water can be obtained the natives are able to make over a peso per day. Goodman, in his report, stated that the average value of the ground worked in certain parts of this property was 2.08 pesos per cubic meter. He obtained this figure by measuring four days' work of a native miner with 3 assistants. This amounted to a recovery of 15.60 pesos worth of gold from 7.5 cubic meters of gravel. He stated further that this represented an average run for native miners in the district. Several test holes have been sunk by the present company over a considerable area from which pannings were taken and values per cubic meter estimated.

The water supply used at present by the Surigao Gold Mining Company is too small to furnish power for hydraulic operations. A survey has recently been made locating a ditch from the Tugunaan River. It was found that this ditch could be built with little difficulty from the Tugunaan to their present reservoir, a distance of 1,700 meters, furnishing abundant water for several hydraulic machines. This would insure the working of all the gravels below an elevation of 120 meters, assuming the junction of the Biga with the Cansuran as zero elevation. There remains a large amount of ground above this elevation which could only be worked by means of a high pressure pump; this area is approximately equal to 3 full-sized claims, while the workable ground below the 120-meter mark amounts to about 6 full-sized claims.

If on account of probable unworkable and barren areas we assume 50 centavos as an average value of the ground, ignoring the values of 2.08 and 5 pesos calculated by other investigators and the value of 1 peso which was obtained in this investigation by estimating the value of numerous panning tests taken from working places throughout the deposit, the amount of gold recoverable by gravity water-power would be about 7,000,000 pesos (3,500,000 dollars U. S. currency) and an additional amount recoverable by high pressure pump 2,600,000 pesos (1,300,000 dollars U. S. currency).

The ground held by the Surigao Gold Mining Company consists of 22 full-sized claims and 8 half-sized claims, an area equal to 1,664 hectares (about 4,160 acres). A large part of the ground in this area not mentioned above as sluicing ground would probably prove to be good dredging ground, especially that portion lying in the Tugunaan Valley. This area contains about 600 hectares (1,480 acres.) A few test holes have been sunk in this ground with a 3.5-inch drill, but no reliable results were obtained. One or two holes were sunk about 20 meters before bed rock was encountered.

Conclusions

This property presents as great possibilities as any mining property in the Philippine Islands. That it has remained so long undeveloped is remarkable, but this is probably due partly to its distance from Manila, the unsettled condition of Mindanao, and the erroneous belief that it had been thoroughly worked over in the past.

MISCELLANEOUS MINERAL DISTRICTS

[By F. T Eddingfield]

During the last year the center of mining activity has shifted from the north to the south. Very little has been reported from Mancayan, Suyoc, Ilocos Norte, Benguet, or Pangasinan. The only northern district attracting much attention has been northern Tayabas at Dingalan Bay, where rich deposits of placer gold were found. A dredge is now being built to work part of this ground.

The chief southern districts are Aroroy, Paracale, Marinduque, Milagros, Mindoro, and Mindanao. The first two are discussed elsewhere.

In Marinduque the stamp mill, erected 19 kilometers south of Santa Cruz, is standing idle because the ore at that point proved too irregular to be profitably worked. A large deposit of leadzinc ore which may prove economical is reported about 10 kilometers from this point. It is said that transportation will probably be the only serious problem to be overcome.

At Milagros, Masbate, are copper deposits which have been prospected for several years under the direction of Mr. Brobst. A company has been formed called the Oklahoma Mining Company which did some development during the past year. Mr. Brobst reported that a 100-meter tunnel cut a vein 13 meters wide at a distance of 40 meters from the mouth, but the tunnel was continued to reach another vein supposed to be 80 meters farther. The vein cut contained lead and zinc.

A shipment of 10 tons of copper ore was sent to the United States from which the following returns were reported:

	Pesos.
Gold	200.00
Silver	85.00
Copper	600.00
Lead	20.00
Total in 10 tons of ore	905.00

Mindoro is known to contain paying deposits of placer gold and several veins of copper. The presence of oil and gas has also been noted, but conditions have been unfavorable to their development.

Mindanao is attracting a great deal of attention. Placer deposits are found at Cansuran and Placer in Surigao, at several points in Misamis, and at numerous places in Butuan on branches of the Agusan River.

FORMOSAN PUBLIC WORKS

Among the public undertakings directed by the Department of PublicWorks in the last fiscal year were the following, with the amounts expended on each: Korisho irrigation works, $141,126; Takao waterworks, $334,102; Keelung harbor works,$488,321; Takao harbour works,$510,536; Tainan local court, $77,981; and repairs to the Governor-general's residence, $63,080. For the years 1912 and 1913 the Government undertakings are:

Taihoku city improvements	$80,285
Bridges and roads	98,000
Tamsui harbour dredging	25,000
Investigation of artesian wells	9,950
Investigation of rivers	50,000
Keelung harbour works	344,750
Takao waterworks	267,500
Kagi waterworks	80,000
Tainan waterworks	100,000
Central laboratory	61,000
Government building (contract to American firm)	350,493
Governor-general's residence, repairs.	35,000
Tainan local court	35,000
Technical school	25,000
Agricultural station	31,650
Taihoku hospital	200,000
Medical school	61,450
Language school	30,578
Middle school	13,275
Girl's higher school	20,267
Takao post office	36,275
Monopoly bureau	105,852
Sugar-inspection, office, Takao	57,122
Sericultural station	36,500
Taihoku prefectural office	60,000
Taichu prefectural office	40,000
Tainan prefectural office	50,000
Total	2,304,047

Railway construction:

Branch line—Kyukyokudo to Ako	475,000
Branch line—Horin to Basshisho	378,500
Double track (section only)	70,000
Total	923,500

The total appropriation for educational purposes in the island amounted to $1,069,000 in 1910. The schools include the middle school, for Japanese boys only; girls' higher school, also Japanese; language and normal school for Chinese and Japanese; and medical school for Chinese only. An appropriation of $29,850 for a technical training school for Chinese was passed last year and the building is now being erected in Taihoku. On the whole, the system of education is impartially administered.

The improvement of the health and sanitation of the island is worthy of special note. Malaria as an endemic disease has virtually disappeared except on the east coast, and bubonic plague is recurrent in only one locality. In the capital city of Taihoku a large sewer, built of reenforced concrete, has lately been completed and other sanitary improvements have been carried forward.

The railway earnings in 1911, amounting to $2,500,000, furnish an index to the general prosperity of the island. The total mileage is 295. A short distance of the main line will be double-tracked next year.

HONGKONG'S NEW POST OFFICE

The recently completed Hongkong Post Office adds considerably to the substantial appearance of the water front of Great Britain's Far Eastern Colony, despite the fact that it does not possess the clock tower, which many residents in their wisdom thought should grace its north-eastern corner. The design is by the Hongkong firm of architects Messrs. Denison, Ram and Gibbs, and was selected as the best of three submitted in competition. The site upon which the building has been erected was purchased by the Government for $508,280 (Mexican currency) and contains 25,414 square feet between Connaught and Des Voeux Roads, at their intersection with Pedder Street.

The basement and ground floor of the building extend over practically the first floor, a large, central courtyard, measuring about 60' X 50', is introduced, round the four sides of which the remainder of the building is disposed. The various offices are arranged on the three sides abutting on the above-mentioned roads, whilst on the fourth, which abuts on a private lane, jointly owned by the Government and the P. & O. S. N. Co., are arranged the lavatories and coolie quarters. The courtyard over the central portion of the ground floor, which consists of a concrete flat, is utilized as an emigration yard, certain portions being provided with a glazed roof supported on brackets projecting from the walls to form a shelter.

The verandah pillars and arches on the ground floor are constructed entirely of granite, which is also extensively used in the pillars and arches of the remaining floors and in the main walls of the building on all three principal fronts. Otherwise the walls are of Canton red brick, faced externally with Amoy bricks. Many of the floors are constructed of cement concrete covered with tiles or granolithic, the others being of teak boarding on hardwood joists. All corridor walls are tiled to a height of 3' 6", all lavatory walls to a height of 5' 0", : the walls of the Chinese Letter Department, which is situated in the

THE NEW POST OFFICE AT HONGKONG

basement, to a height of 4' 0" and the remaining internal walls are plastered and distempered. The whole of the doors, windows and finishings are of teak, stained and dull polished.

For heating the Postal and Treasury Halls, a system of low-pressure hot water heating through radiators is provided. Arrangements are being made to extend this to some other portions of the building which are unprovided with open grates.

The roofs generally are covered with Canton tiles on hardwood rafters supported on iron purlins, but at the gables special tiles and rolls of cement concrete reinforced with small iron rods are used.

The flat roofs to verandahs and over the central portion of the ground floor are formed with cement concrete, covered with "A Grade Pabco" and finished with granolithic.

The building is lit with electric light and fitted with electric fans throughout and is also provided with two electric passenger lifts and one electric goods lift for conveying mails from the basement to the ground floor. Exhaust fans are placed in the Chinese Letter Department for the extraction of foul air.

The main staircase, which is situated at the south-east angle of the building, is of teak. Subsidiary staircases, constructed of granite, are provided in the north-west and south-west angles of the building. A staircase for office attendants is also provided from the first to the third floor. An iron fire escape connecting with all floors is fixed on the West Front adjoining the private lane previously mentioned.

The arrangement of the various Government Departments on the different floors is as follows:—

Basement: occupied principally by the Postal Department, contains the Chinese Letter Department, a tiffin room and a number of store rooms, one of which is used by the Sanitary Department. The boiler for the heating apparatus is also located in the basement.

Ground Floor: entirely occupied by the Postal Department, contains the Postal Hall, 93' × 45', Sorting Hall, 93' × 65', Registration Room, 57' × 29', Box-holders Room, Postmaster-General's and Assistant Postmaster-General's Offices. As already mentioned, an electric lift for raising letters to the main sorting hall connects this floor with the basement.

First Floor: occupied by the Treasury and the Registrar-General's Departments, contains the Treasury Hall, 76' × 36', the Stamp Office, 43' 6" × 14' 3", Stamp Vault, 40' × 18', 12 other offices, ranging from 34' × 30' to 13' 6" × 10', and 2 strong rooms. 3 small rooms on the western side of the building, adjoining the private lane, are used in connection with the inspection of emigrants.

Second Floor: occupied by the Sanitary Department, the Local Audit Office, Education Office, Southern District Office and a telephone exchange, contains in all 21 rooms used as Offices, ranging in size from 50' × 21' to 13' 6" × 10'.

Third Floor: provided for the future expansion of the Departments housed in the building, contains 20 rooms ranging in size from 36' × 30' to 13' 6" × 10'.

In addition to the above, there are 16 small rooms for office attendants on the western side of the building, adjoining the private lane, a mezzanine floor being here interposed between the first and third floors of the main building.

Lavatories are provided on all floors except the basement.

The steel structural work throughout the building has been encased in fine cement concrete with a view to protecting it in case of an outbreak of fire.

It is interesting to note that when the competitive designs were invited the specifications were for a three-storied building to cost the modest sum of $500,000 exclusive of architects fees; but the total expenditure down to December 31, 1911, actually mounted to $1,035,485.50. This increase was largely brought about by the inclusion of a fourth storey, and other alterations in the original specifications.

It was also intended to have clock tower erected, but that was later abandoned. It was when the foundations were nearing completion, that Sir Matthew Nathan, who was then Governor, proposed that a Clock Tower should be added. This proposal was adopted and the necessary alterations in the foundations were carried out, contributing towards the delay in their completion.

Besides giving rise to extra work in the foundations, the proposed addition of a Clock Tower necessitated the substitution of granite for brickwork in the construction of those walls upon which the tower would be carried, thus causing additional expense. Owing to the increased cost of the building resulting from the addition of a fourth storey, the alterations entailed by the proposal to construct a Clock Tower, the general and large advance in cost of work which occurred about the time the Contracts were let and other causes, it was ultimately decided, in January, 1910, that the tower should not be proceeded with in the meanwhile and the structure has been terminated and covered over immediately above the ridge of the roof of the main building.

The building was occupied by the middle of of 1911, though the installation of the heating apparatus and various minor alterations had to be carried out subsequently.

CHINA'S FINANCES

COMPLETE SCHEDULE OF OBLIGATIONS

In view of the uncertainty that prevails in many quarters in regard to the actual extent of China's financial obligations at the present time the schedule we give below, which is authentic, will be read with interest:—

DETAILED LIST OF PAYMENTS TO BE MADE BY CHINA UP TO JUNE 1913

FIRST PERIOD

Payments to be made up to the 31st December 1912

(*a*) INDEMNITY AND OLD LOANS

Indemnity from October 1911 to September 1912	H. K. Tls.	24,885,125	
Indemnity from October 1912 to December 1912	„ „	4,974,825	
Loan from Hongkong Bank	Shanghai Tls.	1,166,300	
do.	£ stg.	14,375	
do.	„ „	218,000	
Tientsin-Pukow	„ „	208,808	
do.	„ „	241,738	
Loan from Arnhold Kerberg	„ „	9,000	
do.	„ „	13,500	$44,740,735.70

(*b*) TEMPORARY SHORT LOANS

Short period patriotic internal loan	Chingping Tls.	269,900	
do.	Kuping „	30,000	
Money owed to Bank of Communications	Chingping „	100,000	
do.	„ „	80,000	
do.	$	200,000	
Bank of China	$	70,000	
Commercial Protection Bank	$	400,000	
do.	Kungfa Tls.	10,000	
Firm Kang Mao	„ „	520,000	
Cantonese Guild	$	1,344	
do.	Shanghai Tls.	421,500	
Kiangsu Bank	$	20,000,000	
Lin Chu Tsao	Shanghai Tls.	150,000	
Chinese abroad	„ „	279,606.31	
do.	$	211,686,465	
Singlung Co. at Yunan through Wei Wu Pu	K'ping Tls.	506,250	
Merchant Bank by Board of War.	Chingping „	154,622	
do.	$	66,300	
Posthumous donations account	Tls.	126,564,138	
do.	$	360	
Salary account by Board of War.		9,771,36	
do.	Tls.	431,570,226	
by Board of Navy for cost of ships, etc.	$	989,995,50	
by Board of Navy to Native Banks	$	129,926,40	
by Board of Interior to Yufeng Native Bank	Tls.	43,000	
by Board of Interior to Government fund account	„	75,781,60	
by Board of Interior to Major Hengliyi Bank	„	34,055,57995	
Money owed to Deutsch-Asiatische Bank for Chinese Minister in Brussels	Frs.	60,000	
Deutsch-Asiatische Bank for school fee by Minister in Berlin	Mks.	250,000	
Diederichsen & Co.	„	5,000,000	
Carlowitz & Co. for guns	Tls.	1,568,155,46	
Bielfield & Sun for guns	„	151,700	
American Bank for students going to America	Kungfa „	30,000	
American Bank for Chinese Minister in Washington	G. $	156,000	
to Russo-Asiatic Bank by Board of Education	Tls.	70,000	
Belgian Bank for school fee.	£ stg.	20,000	
Belgian Bank	Frs.	129,782,90	
Banque de l'Indo-Chine for students fee	„	275,000	
Banque de l'Indo-Chine	„	200,000	
Yokohama Specie Bank	Kungfa Tls.	251,485,46	
Yokohama Specie Bank for school fee	Yen.	270,000	
do.	„	10,396	
Yokohama Specie Bank by Board of Interior	Kungfa Tls.	87,000	
do.	$	2,000	
Japanese firm Ta Tsiang for war munitions	Y.	1,821,760	
do.	Tls.	575,320	
Mitsui Co. for war arms	Chingping „	86,000	
do	Y.	79,500	
Yita & Co. for war arms	Tls.	196,340	
Japanese merchants	„	67,000	$32,031,399,6388

(*c*) LOANS MADE BY NANKING AND OTHER PROVINCES

Money owed to Mukden Gov't Bank (interest not included)	Y.	2,446,831	
Kiangsu Merchants native loans for helping		400,000	
Shanghai market interest account.	$	110,000	
Canton native Banks about		516,000	
do. interest		258,000	
Kuang Sui Co. Heilung Kiang	Tls.	3,960,000	
Hunan Gov't Bank	„	1,000,000	
Ta Ching Bank (interest excluded)	„	200,000	
Salt Merchants (deducted from Salt Tax)	„	960,000	
Ta Han Bank (interest excluded)	„	300,000	
Merchants at Kiangsi	$	556,460	
Bank of Republic	Tls.	1,170,260	
Shansi Merchants & Gentry	„	540,000	
do.	„	85,000	
do.	$	700	
Money owed to Shansi Merchants & Gentry copper cash.	Tiao.	4,280	
Bank of China by former S'hai Tutu	Tls.	100,000	
Hongkong Bank at Hupei about	„	77.125	
Hongkong Bank (Capital and interest)	„	1,326,025	
Four Nations Banks for interest account	„	140,000	
Carlowitz & Co. (Interest excluded)	„	560,000	
Carlowitz & Co. (deduct from Mines products, interest excluded)	„	1,000,000	
Carlowitz & Co. by Shanghai Arsenal about	„	94,000	
Mitsui Co.	Y.	300,000	
do.	Shanghai Tls.	700,000	
Mitsui Co. for Hanyang Iron Works (interest account)	Y.	70,000	
Mitsui Co. at Anhui	„	200,000	
Yokohama Specie Bank Canton	Tls.	500,000	
Bank of Formosa at Canton	Y.	600,000	
do	„	400,000	$24,661,586,43

SECOND PERIOD

Payments to be made from January to June 1913

(*a*) BY THE CENTRAL GOVERNMENT

Indemnity	H. K. Tls.	9,949,650	
Kelung Co.	£	6,000	
Debts contracted by Lanchow Mines	Tls.	303,463,3896	
do.	$	170,000	
Patriotic loan (interest account)	$	338,100	
War loan interest	$	400,000	
Advance for Lung Sung Co. Yunan	Kuping Tls.	250,000	
Advance on Currency Loan	£	424,000	
Six Groups preliminary advances	£	1,800,000	
Hongkong Bank	£	28,125	
do.	£	12,000	
do.	Tls.	38,150	
British & German Loan	£	417,616	
Arnhold Karberg	£	72,666,13/4	
do.	£	9,000	
do.	£	13,500	
Belgian Loan	£	1,025,000	
British & Belgian Loan		256,250	
Franco-Russian Loan 1895	Frs.	5,556,905	
Interest on Crisp Loan	£	100,000	$68,808,751,612

(*b*) BY NANKING AND THE PROVINCES

Capital and interest to Mitsui	$	2,587,500	
do. Bank of Formosa at Canton	$	200,000	
Capital and interest Carlowitz at Chekiang	Mks.	1,268,273.97	
Advance to Wei Wu Pu for American student fee	Tls.	7,000	
Interest to Russo-Asiatic Bank	„	336	
Interest on loan from Hongkong Bank for Kiangsu	„	70,000	
Interest on loan from Hongkong Bank for Shanghai market	„	120,000	
Four Nations Banks interest	„	70,000	$4.171,890,855

RECAPITULATION

China will have to disburse:

FIRST PERIOD UP TO 31ST DECEMBER 1912

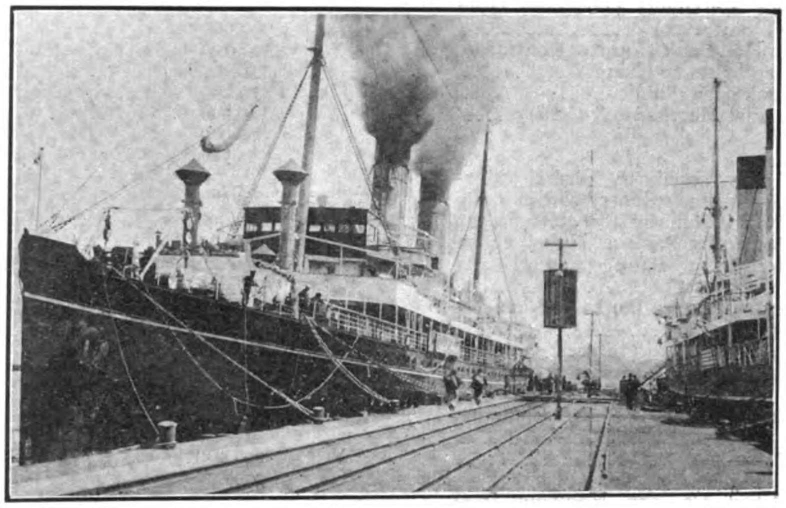
(Indemnity and old Loans)	$ 44,740,735,70	
(Temporary short Loans)	32,031,399,6388	
(Loans made by Nanking and others Provinces)	24,661,586,43	$101,433,721,7688

SECOND PERIOD FROM JANUARY TO JUNE 1913

(Loans made by the Central Government)	68,808,751,612	
(Loans made by Nanking and other Provinces)	4,171,890,855	$72,980,642,467
Total		$174,414,364,2358

THE RAILWAYS OF CHOSEN (KOREA)

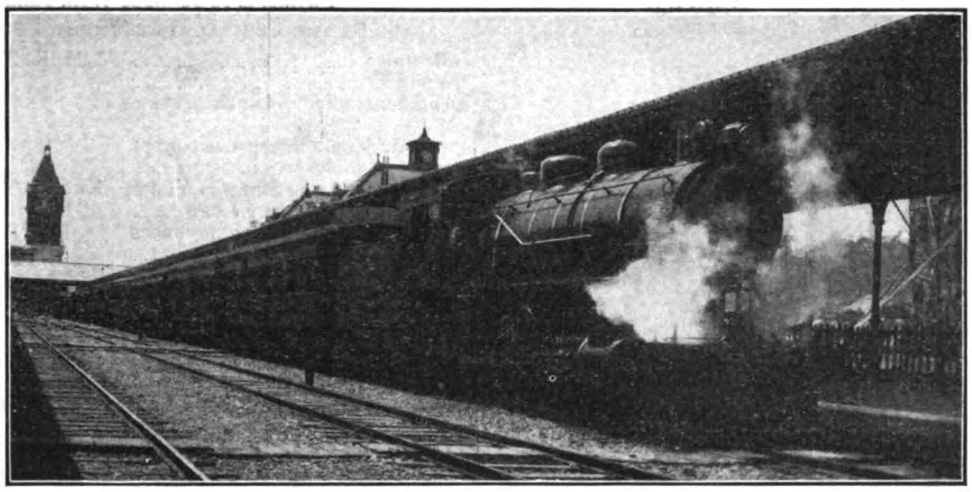
PICTURESQUE ROUTES AND WELL-APPOINTED TRAINS



FERRY STEAMER ALONGSIDE THE PIER AT FUSAN

PAVILIONS IN THE SHOTOKU PALACE, SHOTOKU

Well directed efforts are being made by the administration of the Chosen (Korean) Railway to make the service as attractive for tourists as it is proving to be useful for commercial purposes. Korea is no longer a Hermit Nation. The enterprise of the Japanese is opening up the country as rapidly as funds will allow, and in addition to the main trunk line from Fusan to Antung, branch lines are being pushed out east and west, which are opening up districts full of interest to the traveller. We recently gave the latest statistical information available in regard to the commercial operation of the Korean railways and our present purpose is briefly to illustrate the facilities and attractions of the line to the tourist. It may be well to explain that the Japanese nomenclature is followed in this article and the reader is consequently asked to bear in mind that Keijo means Seoul, Jinsen means Chemulpo, Heijo means Pyongyang and Shingishu denotes Wiju.



THROUGH TRAIN LEAVING THE FUSAN STATION

General Information

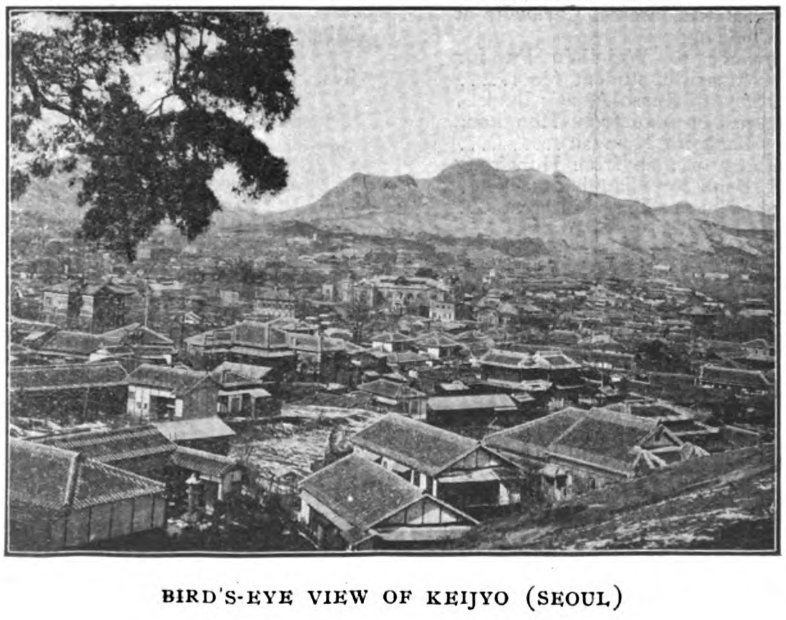
All the railways of the Government-General of Chōsen are of standard gauge and at present have a length of about 800 miles. The main line starts at Fusan, passes through Taikyū, Taiden, Ryūzan, Keijō (Seoul), Kaijō (Pyongyang), &c., and terminates at Antung beyond the River Yalu which forms a natural dividing line between Chōsen and China.

There are branch lines to Masan, Kunsan, Jinsen (Chemulpo), Rensen, Chinnampo, &c.

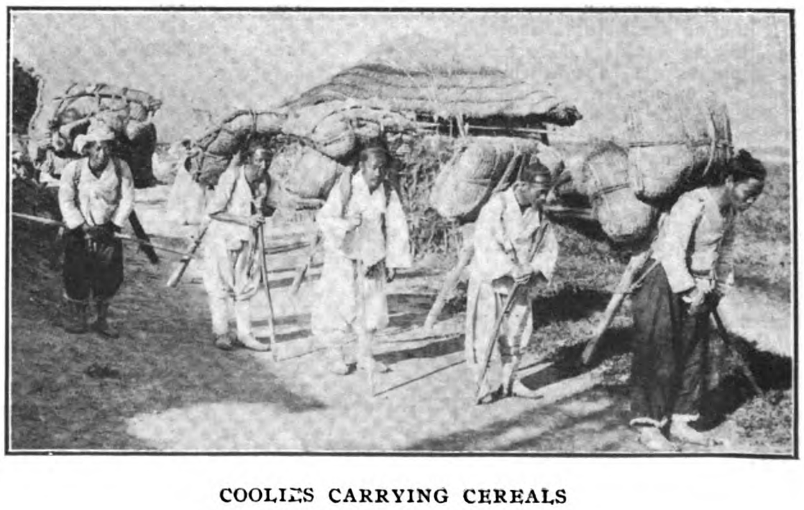
The main line open to traffic is divided into two sections, namely:—

The Keijō—Fusan Section; the Keijō—Antung Section.

In addition, the Konan line which leads from Taiden to Moppo on the south-west coast, and the Keijō-Gensan line which leads from Ryūzan to Gensan on the east coast, are in course of construction. Parts of these lines are now open to traffic and the work is being



BIRD'S-EYE VIEW OF KEIJYO (SEOUL)



COOLIES CARRYING CEREALS

AN ANCIENT IMAGE

rapidly pushed forward, so that in the near future the whole length of available lines will aggregate 1,000 miles.

The Keijō-Fusan and Keijō-Antung lines are joined at Ryūzan and form a trunk line throughout the peninsula, extending from Fusan in the south to Antung in the north-west. In the north, connection is made at Antung by the railway bridge newly completed across the River Yalu with the Mukden-Antung branch of the South Manchuria Railway, which joins the main line at Mukden, thence to Peking via the Imperial Railway of North China. The triweekly express trains between Fusan and Changchun which are run in connection with the trains for Europe via a branch line of the Chinese Eastern Railway, have lately been put into operation.

In the south, the ferry service between Fusan and Shimonoseki is maintained twice a day by the Imperial Japanese Government Railways' steamers fitted with every up-to-date accommodation for the comfort and safety of passengers.

Between Jinsen and Dairen (Dalny), transportation is effected by the Nippon Yūsen Kaisha's and Osaka Shōsen Kaisha's liners six times a month.

The Chōsen Railway, thus forming the shortest overland route between Japan, Chōsen and Europe, and one of the most important trunk lines of the round-the-world traffic, is expected to draw many passengers from Europe to Japan and vice versa.

POINTS FOR PASSENGERS

Express Trains

Fusan-Changchun.—Triweekly through express trains which take 1st class, sleeping-and dining-cars only, are run in both directions.

Passengers travelling between the Far East and the West should note that Express Extra Tickets may be purchased in addition to the ordinary fare tickets.

The charges are as follows:—

Under 200 miles, Y2.00
Under 500 miles, Y3.00
500 miles and over, Y5.00

Children under four years of age travel free; and those of four years and under twelve, at half fare.

An Express Extra Ticket is good for one continuous ride only.

A sleeping-car is attached to each of these trains and the accommodation is obtainable by paying the following charges:—

Fusan or Nandaimon—Antung	Y5.00
Shingishū or Antung—Chang-chun	Y5 00
Fusan—Changchun	Y8.00

Children under five years of age for whom a separate berth is not required, are free of charge: those under four, who use separate berths, are charged fares provided for children for ordinary fare tickets and Express Extra Tickets, in addition to full charges for sleeping-berths.

Noon in Chōsen corresponds with 11.00 a.m. in Manchuria.

The Triweekly Express Trains, known as the "Chosen-Manchuria Express Service," take excellently equipped Sleeping, Dining, and 1st Class Cars only and are run between Fusan and Changchun connecting with the following Trans-Siberian express trains:—

The Express leaving Fusan for Changchun on Tuesdays .. Wagons Lits for Moscow (Train No. 201)
" " " " " Fridays .. State Express for St. Petersburg .. "
" " " " " Sundays .. State Express for Moscow "
The express leaving Changchun for Fusan on Fridays .. Wagons Lits from Moscow " 202
" " " " " Mondays .. State Express from St. Petersburg .. "
" " " " " Wednesdays State Express from Moscow .. "

The Daily Express Trains on the lines of the Chosen Railway take cars of all classes (1st, 2nd and 3rd) and Dining or Sleeping Cars.

The Fusan-Shimonoseki Ferry Services:—On Monday, Thursday, Wednesday and Saturday.

Station Hotels:—At Fusan, Shingisho and Mukden.

Customs Examination:—At the Antung Station and on board the Fusan-Shimonoseki ferry steamers.

Fusan-Antung.—Besides the above service, two daily express trains are run, morning and night, between Fusan and Keijō, and one between Keijō and Antung. In other words, in addition to the morning express train from Fusan to Keijō and vice versa, the night service starts from Fusan and proceeds to Antung and the train leaving Antung for Fusan every morning turns into the night service from Nandaimon (Keijō). Sleeping-cars (Berth charge: Y. 4.00) are attached to the express trains running through between Fusan and Antung.

Keijo-Jinsen (Chemulpo).—Express trains besides six ordinary trains in both directions make three trips daily between these two places. At Yeitōho and Ryūzan, these trains are regularly connected with the aforesaid express trains on the Keijō-Fusan and the Keijō-Antung lines.

N.B. Cars of all classes are attached to the above express trains on this section.

Ordinary Trains

Sanroshin-Masan.—Trains make five return trips a day. At Sanrōshin, these trains make close connections with those on the Keijō-Fusan line.

Taiden-Kunsan.—(A portion of the projected Konan line). Trains make three return trips daily.

Ryuzan-Rensen.—(A portion of the projected Keijō-Gensan line). Trains make two return trips daily.

Heijo-Chinnampo.—Trains are run thrice a day in each direction.

Ordinary trains on the above four sections take no first class cars.

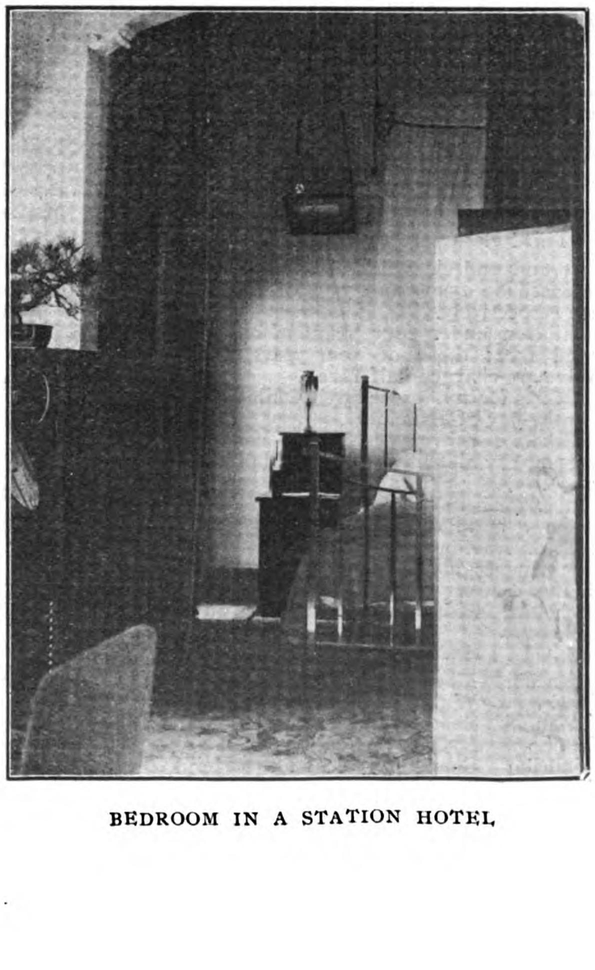
Koshu-Kenjiho.—Trains are run thrice a day from each end.

Heijo-Jido.—Trains are run twice a day in each direction.

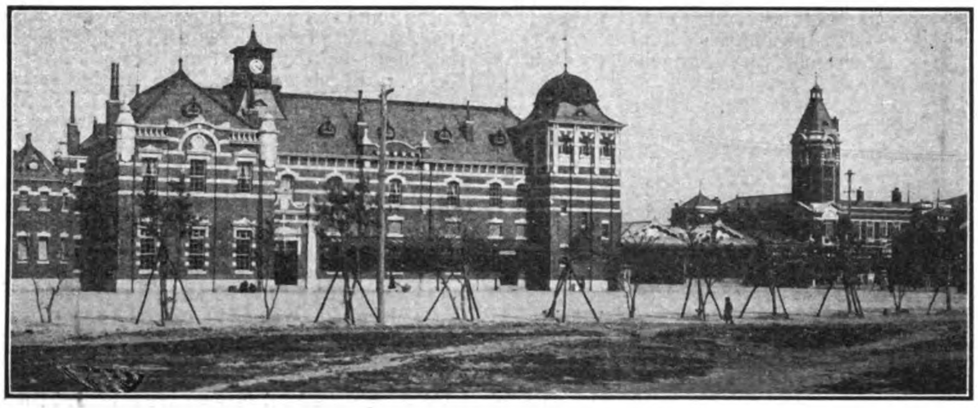
Third Class tickets only are issued for the above two sections.

Sleeping-Cars: Sleeping-cars with the latest accommodation are attached to the tri-weekly through express trains between Fusan and Changchun, and also to the through express train between Fusan and Antung.

Dining-Cars: Dining-cars provided with excellent equipment under direct railway management, are attached to the tri-weekly express between Fusan and Changchun. Express trains on the Keijō Fusan section take dining-cars on which European meals are served on the à-la-carte plan. European meals are also obtainable



BEDROOM IN A STATION HOTEL



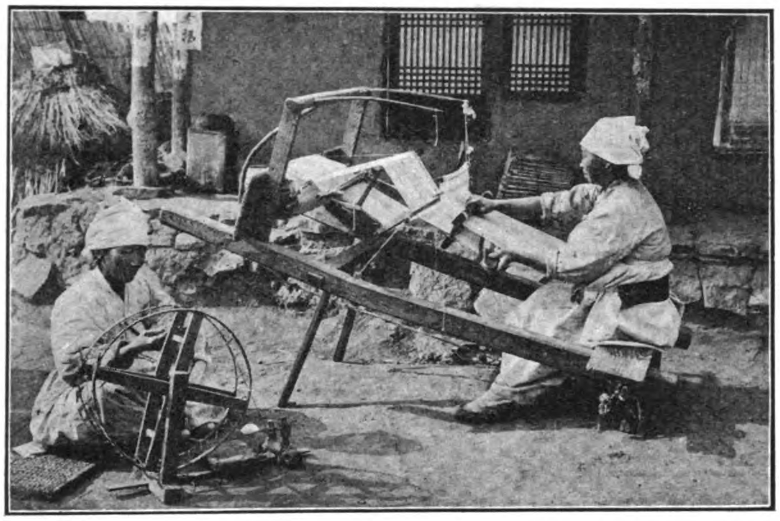
RAILWAY STATION AT FUSAN

Table A

Mileage: No. of Persons	under 50 m.	under 200 m.	200 m. & over
25— 50	20 %	25 %	30 %
50—100	22½%	27½%	32½%
100—200	25 %	30 %	35 %
200—300	27½%	32½%	37½%
300—500	30 %	37½%	40½%
over 500	35 %	42½%	50 %

on the express trains between Keijō and Antung as well as the through trains between Fusan and Antung.

Cars or compartments may be reserved on payment of a sum equivalent to the charges for two-thirds of the seats. If more than two-



WEAVERS AT WORK

thirds of the seats are occupied, the additional fare must be paid.

Special Conductors wearing red bands round their arms are on duty on every express train on the Fusan-Keijō or Antung Section to render passengers any assistance.

Train Boys wait on passengers in 1st and 2nd class cars only.

Fares and Tickets

Third class fare 2 Sen......per mile.

1st and 2nd class tickets are issued at rates increased by 150% and 75% of the 3rd class fare respectively.

Children under four years of age are conveyed free; those of four years and under twelve are charged half fare.

Tickets for not exceeding 50 miles are available the day of issue only.

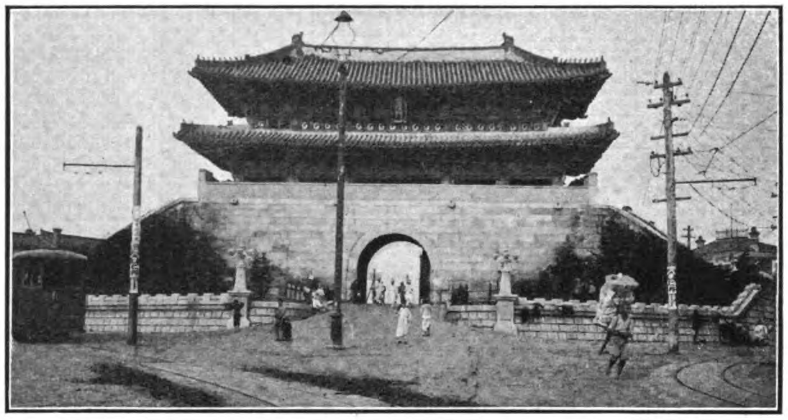
Tickets for over 50 and not exceeding 100 miles are available two days (including day of issue).

In regard to tickets for over 100 miles one day is allowed for every additional 100 miles or fraction thereof.

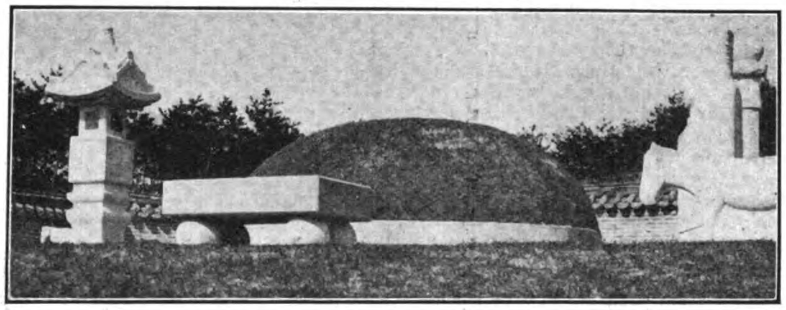
Passengers may break their journey at any of the regular stop-over stations mentioned below, within the time-limits of their thickets:—

Fusan	Sōryō	Kiho	Sanrōshin
Fusanchin	Mitsuyō	Taikyū	Kinsen
Yeidō	Waikwan	Taiden	Chōchi-in
Ten-an	Seikwan	Heitaku	Suigen
Yeitōho	Ryūzan	Nandaimon	Kaijō
Shimbaku	Shari-in	Kōshū	Heijō
Shin-anshū	Teishū	Sensen	Shingishū

Antung.



SOUTH GATE KEIYJO (SEOUL)



A QUEEN'S TOMB NEAR KEIYJO (SEOUL)

For a party of not less than 25 persons travelling in the same train over a distance not less than 20 miles in a single trip, the fares may be discounted as follows:—

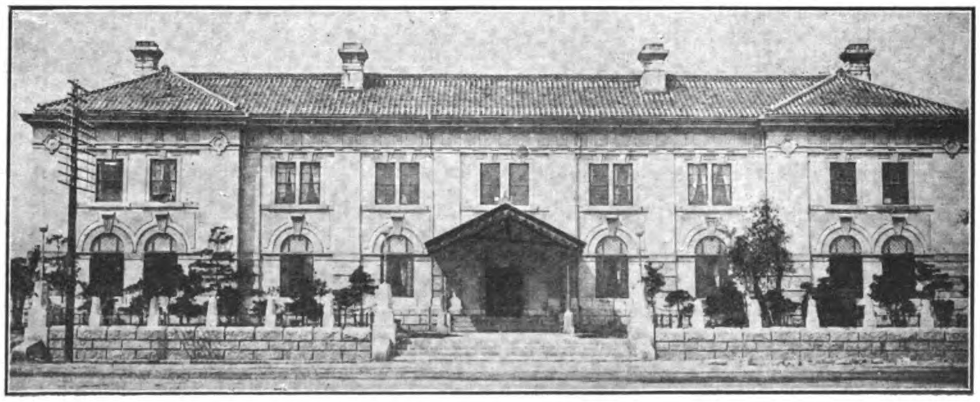
(*See Table A*)

Passengers are allowed the following quantities of personal luggage free of charge:—

100 kin (about 133 lbs.) for a 1st class passenger
60 ,, (,, 80 ,,) ,, 2nd ,, ,,
30 ,, (,, 40 ,,) ,, 3rd ,, ,,

The authorized Ticket Agencies are Messrs. Thos. Cook & Son and the International Sleeping Car & Express Trains Company.

Inquiry offices are provided at the principal stations on the line for information regarding the service of trains, selection of routes, connections at junctions, passengers' fares, luggage, parcels, goods rates, etc.



CHOSEN COMMUNICATIONS BUREAU

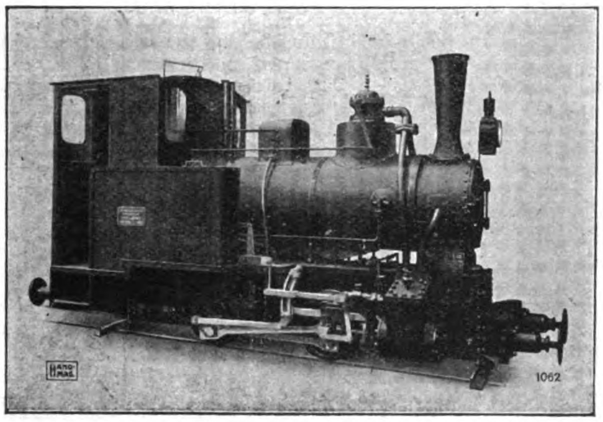


FIG. 1

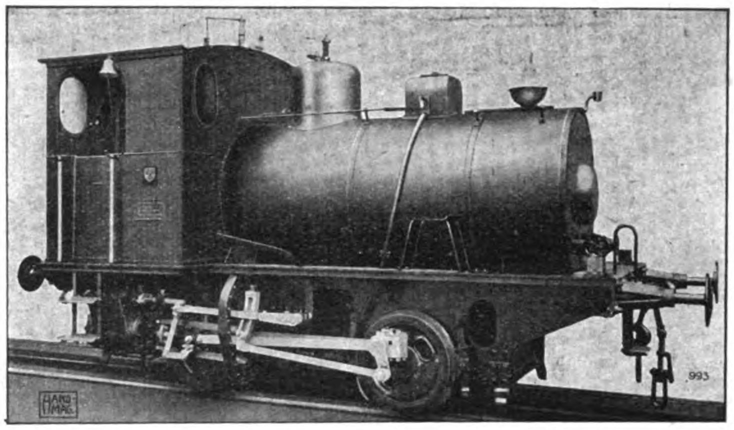


FIG. 2

LOCOMOTIVES

HANNOVERSCHE MASCHINENBAU-ACTIEN-GESELLSCHAFT, VORMALS GEORG EGESTORFF, HANNOVER-LINDEN.

(General-Agents for China: H. DIEDERICHSEN & Co.)

Locomotives of all sizes and for every gauge of line are built in the Works of the Hanomag. *Fig. 1* shows a 50 H.P. narrow gauge locomotive for constructor's use, such as are commonly used for the transport of earth on excavating work and for building purposes. In constructing such locomotives it must first of all be taken into consideration that sharp curves even in badly laid tracks must be negotiated without the least difficulty. On account of the light section of rails generally used on such temporary tracks the axle pressure must be reduced as far as possible, the boiler must not be too high, so that the danger of the engines' toppling over may be obviated if the latter enters a curve at a high speed. As for the rest, all parts must be as simple as possible, because as a rule no special care can be taken in handling such engines. Complicated parts have, therefore, to be strictly avoided when building such engines. In building the locomotive shown in fig. 1 these points have been strictly observed. In order to allow the driver to have an unimpeded view of the track in front of him, the feed water is stored in tanks built between the frame plates, which tanks help at the same time to stiffen the latter.

A particularly interesting locomotive of a special type is shown in *fig. 2*. This is a fireless locomotive such as the Hanomag has placed on the market, a great number of which are giving the best satisfaction in service. The boiler consists solely of a water tank filled to two-thirds of its capacity with water and protected by special insulating materials from loss of heat through radiation. The working of this engine is as follows:

The water tank is first heated by introducing into it steam from a stationary boiler plant. As soon as the pressure of the steam in the tank has nearly reached that of the stationary boiler plant the supply of steam is cut off. The engine can then be placed in service and perform work corresponding to the amount of heat introduced into the tank. The latter has to be recharged in intervals of 2 to 6 hours according to the conditions of service. The loss in pressure of the steam brought about by radiation is quite insignificant, as has been proved by experience.

Fireless locomotives of this kind have speedily found a ready market in works where the danger of fire exists, such as powder and ammunition factories and gas works and have proved to be greatly advantageous in industrial concerns where shunting work is light. The danger of the boiler of an engine of this kind exploding is of course reduced to nil. No attention need be paid to the boiler after it has been charged with steam.

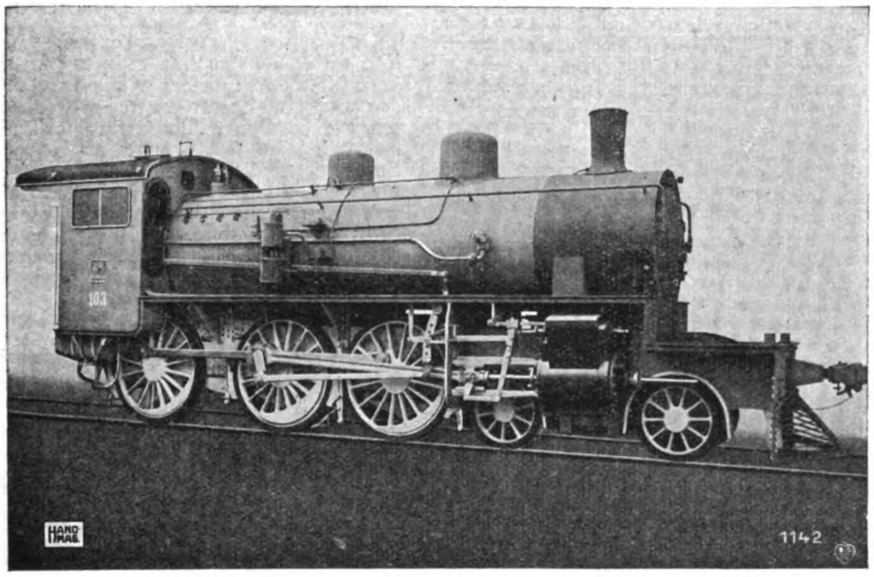


FIG. 3

Fig. 3 shows a 4-6-0 type of express train engine and tender with two four wheeled bogies, which locomotive has been designed and supplied by the Hanomag for the Tientsin-Pukow Line of the Chinese State Railways. The construction of this engine is fully adapted to the particular requirements on Chinese Railways. The boiler is fitted with a specially large grate and fire box in order to ensure its good steaming capacity.

Fig. 4 shows a very remarkable type of locomotive. This is a 2-12-2 type of goods locomotive for 1067 mm gauge which has been designed and constructed by the Hanomag to the order of the Dutch State Railways, Java. The greatest wheel pressure admissible on lines of these latter railways is 4,750 kilos, whilst curves as sharp as 140 m in radius have frequently to be taken. The engine was adapted for taking curves with ease without having recourse to complicated expedients, by simply giving side play to the first and sixth coupled axles which are constructed on the Gölsdorf principle. The flanges of the wheels of the two middle axles were turned down 5 mm more than the others. A lateral play of the first and last coupled axles of 30 mm on each side, sufficed to allow of the engine taking the curves with the necessary ease. This engine has given splendid satisfaction in service. The locomotives took the curves with the greatest ease. In the case of this large

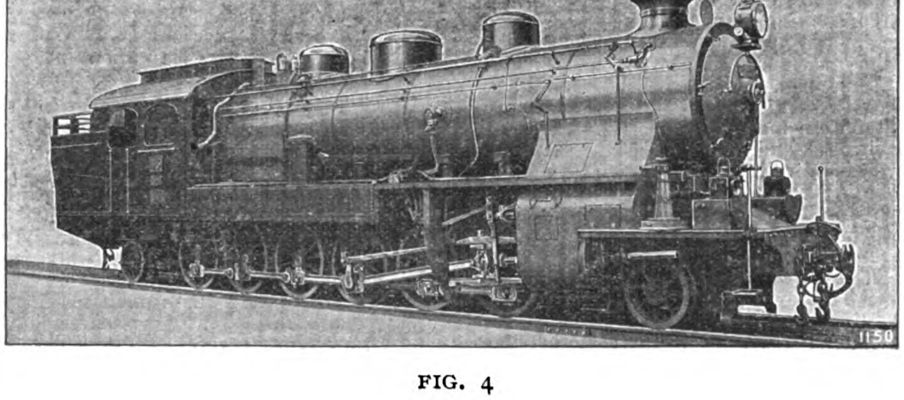


FIG. 4

locomotive as well, the driver is given an unimpeded view of the track before him, the water supply being placed partly between the frame plates and partly underneath the boiler. The boiler is placed comparatively high, so that the staybolts are easily accessible and the supply of air to the grate is excellent. The engine is fitted with a smoke tube superheater of the Schmidt type, which is calculated to obtain a mean temperature of superheat of 320° C. The engine just described which has been built to the designs of the Hanomag, proves that twelve couplers can also be used without difficulty on lines with light permanent way and sharp curves.

PHILIPPINES PORT WORKS

Annual Report of Bureau of Navigation

Following is the report of the director of the bureau of navigation on the activity of the port works division during the fiscal year 1912:—

By Act No. 2059 passed on February 3, 1911, P. 500,000 was appropriated for the improvement of ports, dredging of navigable rivers and canals, and other similar specified purposes, allotable in the discretion of the director From this appropriation allotments have been made during the fiscal year 1912 as follows:

For the improvement of the port of Manila by the construction of roadways and drains in the port district	P.87 892.54
For the completion of the river wall at Iloilo	60,000.00
For dredging in Manila Harbor	150,000.00
For building two small steel dumping scows	15,000 00
For repairs to Manila breakwaters.	10,469.90
For completing harbor improvements at Bais, Oriental Negros	17,000.00
For building a small wharf at Larena, Siquijor Island	4,000.00
To complete construction of the Cagayan River snag boat	32,637.47
For dredging in Manila esteros	26,000.00
	P. 403,000,00

Manila Dredging

Special attention has been given to the dredging of the old esteros of the city of Manila to make them navigable for small craft and improve sanitation. Two hundred and sixty per cent. more work of this nature has been done during the fiscal year 1912 than during the previous fiscal year, and we now have 5,300 lineal meters (3.3 miles) of esteros navigable at low tide by loaded cascos, and an additional 1,600 lineal meters navigable at mean tide, a total of 63 per cent. of the 10,980 lineal meters which have been selected for improvement for navigation. The actual number of cubic meters of material removed was 128,118 representing an increase of 50 per cent. over the amount dredged from Manila esteros in all the previous years of American occupation combined. Some of this material has been deposited on low lands in the vicinity of the work, but in most cases it must be towed out to the sea and dumped because of our inability to prevail upon any one to take delivery of it from the most convenient delivery points as a gift, for filling purposes.

The channel of the lower Pasig river was maintained at a depth of 18 feet, there having been an increase of 21 per cent. in the amount of material removed from this portion of the river and the outer bar.

In the outer harbor, due to the fact that the only dredge in the service which will reach to the depth required was held up for repairs nearly five months and was absent at Iloilo an additional 2½ months, there was a decrease of 36 per cent in the amount of material moved. On December 11, 1911, the director allotted P. 150,000 for dredging to continue the deep water area in the outer harbor southward with a proviso that the material removed should be deposited behind the Cavite boulevard retaining wall. Bids were advertised for and a contract for the work signed and approved on May 3, 1912. Operations had not yet been started at the end of the fiscal year and probably will not be until after the typhoon season.

The work fell off 60 per cent. in the upper reaches of the Pasig river because of the withdrawal of one dredge for estero work, and the extremely poor condition of repairs of the one left there, no funds being available for the construction of a new steel hull to replace the present worn out wooden structure.

Heavy repairs will be required on the dredges and other floating plant next year if they are to continue in service.

Manila Port District

It is provided by the law that the streets on land reclaimed by the insular government shall be constructed by the insular government, and maintained by the municipality in which they are located. In accordance with this law there has been allotted during the last two fiscal years from port works funds for the construction of streets curbing and storm water drains in the port district, city of Manila, a total of P. 126,892.54, practically all of which has been expended. As a result, the street system in our new shipping district is beginning to take definite form. It is to date sufficient for the needs of the three large piers and the completed structures in the district, but at the rate the blocks are being leased it will soon be necessary to materially extend the system.

A force of men has been employed continually on repairs, alterations and improvements at steel piers 3 and 5, the maintenance cost of which is taken out of the receipts from their operation. The division exercises a general supervision over the construction by private capital of plant abutting on the inner basin, for general marine construction and repair work. This plant will include marine railway capable of docking vessels of 3,000 tons displacement, two smaller railways for launches and smaller craft, machine shops and foundry, construction was started in February 1912. At the close of the fiscal year the large marine railway was approximately fifty per cent., and the machine shop buildings twenty-five per cent., completed. No work had been done on the smaller railways. This plant will be able to handle any interisland boat and many of the foreign vessels calling at Manila, and if able to compete with Hongkong yards for extensive repairs should be the means of keeping in the Islands large sums of money now expended abroad.

Cavite Boulevard

No additional funds were provided for work on the Cavite Boulevard, and the contractors have only worked intermittently on repairs to the wall. No extension in length was made. Of the total funds so far provided, there remained unexpended on June 30, 1912, P. 47,336.94, most of which it is estimated will be required to put the wall in good condition, including the crushed stone backing in preparation for the back fill, after the typhoon season.

Manila Breakwater

The work on the south breakwater which was reported under way in our last annual report was completed in October, 1911, and the superstructure wall on the west breakwater has been brought up to grade. The breakwaters are now in very good condition throughout their entire length and no extensive repairs should be necessary for several years. The severe typhoon on July 14th to 17th, 1911, did practically no damage to them.

Pasig River Walls

The back filling behind the two new sections of wall constructed on the south bank of the river last year was completed in September, 1911, and repairs to the old Spanish wall have been made at various points in the lower river. They are now in fairly good condition and should require no extensive repairs for at least a year.

Iloilo Harbor Improvements

The extension of the reinforced concrete wharf on the south side of the Iloilo River was continued by the administration throughout the 12 months. At the close of the year 346 lineal meters of wharf had been completed and 51 meters partially constructed, the whole equivalent to about 365 lineal meters of completed wharf, the cost to date approximating P. 515.00 per lineal meter. It is estimated that the entire 638.5 meters of improvement contemplated (241.5 meters of retaining wall and 397 meters of wharf) will cost less than P. 400,000. So much benefit has been derived from, and so much handling expense saved through the wall and wharf constructed, that a petition to extend the work to the upper reaches of the river, signed by practically all the shippers in that district, has been received. If funds become available, such an extension would be of great value.

Dredge No. 1 was dispatched from Manila to clear out the bed of the lower river which had silted up considerably. Owing to the urgent need of the dredge at Manila time was taken to clear only a comparatively narrow channel from the bar by the removal of 90,280 cubic meters of material, and redredging will be probably necessary in the near future,

Cebu Harbor Improvements

On August 10, 1911, a contract was entered into with a construction company for the building of 250 lineal meters of plain and reinforced concrete wharf as an extension to the existing sea wall at Cebu. The contractor's plant was assembled on the ground about the last of September and active work commenced during October. At the close of the year the work was progressing satisfactorily, four large standard piers and one small pier having been completed and the foundation driven for a fifth large pier. The wharf will accommodate vessels of thirty feet draft.

Bais Harpor Improvements

The improvements at the port of Bais, Oriental Negros, which will serve a large sugar producing section, described in our previous report, were completed about May 1, 1912. The cost of the work, P. 67,000.00 considerably exceeded the first allotment on account of the elaboration of the scheme after the project was made under way.

Pandan Harbor Improvements

Nine hundred lineal meters of the right bank of the Abra River at Pandan, the port for Vigan, Ilocos Sur, were revetted as a protion against erosion at an approximate cost of P. 31,800.00 allotted by the director. The revetment placed aggregated 5,740 square meters, some 10,000 cubic meters of stone delivered on the site of the work having been used therein. Five thousand five hundred cubic meters of sand and gravel back fill were used in indentations in order to secure proper alignment.

Cagayan River Improvements

The combination snag boat, dredge and pile driver built by the bureau of navigation to maintain the channel of the Cagayan river and protect its banks reached Aparri on April 18, 1912. The river being subject to terrific floods when all craft must seek shelter, the first project completed was the creation of a harbor of refuge for the snag boat herself and other craft. This was practically all that had been accomplished to the end of the year.

FAR EASTERN RAILWAYS

China's Trunk Lines.—The Chinese Ministry of Communications has proposed four trunk lines, two running north and south and two running east and west, through the country. The proposal was submitted to the members of the Cabinet and met with their approval.

I: the Central longitudinal line, beginning from Mongolia running through Peking and Shansi, turning southward to Hankow and thence to Chinlung. Peking is to be the centre of this line.

II: the Eastern longitudinal line, beginning from Manchuria, passing through Chihli, Shantung, Kiangsu, and Chekiang and ultimately reaching Fukien and Kwangtung.

III: the Northern latitudinal line, beginning from Haichow passing through Honan and Tungkuan and Kansu and thence to Ili meeting the Central Asiatic Railway (?).

IV: the Central latitudinal line, beginning at the Nanking terminus of the Nanking-Shanghai Railway passing through Wuchang, entering Szechuan.

Siam Railways.—The Petchaburi line, Siam, will be placed under the control of the Southern Line administration, of the Royal State Railways, from the 1st April next. This change was inevitable, the line to Petchaburi being merely a section of the Southern Line.

Heilungkiang-Mukden Line.—The long pending issue of constructing a Chinese railway from Heilungkiang either to Tiehling or Kaiyuan appears to have been shelved after all in favour of the proposed construction of a line between Heilungkiang and Mukden, reports the *China Critic*. The Chinese authorities have evidently avoided disappointing the people of either Tiehling or Kaiyuan which two towns regard each other as a rival. Moreover, it would be only natural for them to choose having this new railway connected with their own line at Mukden rather than with the S. M. Railway at Tiehling or Kaiyuan.

Chekiang Railway.—The construction of the Ningpo-Shaoshing section of the Chekiang Railway is proceeding apace at this end of the line, writes a Ningpo correspondent. Metals have been laid to a distance of about fifteen *li*, and a construction train is kept busy in the transport of materials. The station platforms are being put into shape, and it is reported that trains will be running to Shaoshing early in the summer of 1913. It is difficult to obtain accurate information as to the condition of the funds. Much of the money promised in the shares issued two years ago has certainly not been forthcoming, and recent endeavors to get more shares taken up have not been successful. No beginning has yet been made with the important bridge over the Pahkuan river, but it is at least likely that at the present rate of progress trains will be running in 1913 between Ningpo and Yuyao.

A correspondent writing to the *China Press* on December 3 said:—There is now a train running from Ningpo, at the salt gate, where the station is, to Bah-Saw and further on every day, sometimes twice a day. The fare to Bah-Saw is five cents. Hundreds of Chinese travel by it "just for the fun of the thing." It is said that the train soon will be making trips twice daily to Sze-hze, a place some thirty miles from Ningpo. They are building the station at Ningpo and will begin these trips at Christmas.

SHANGHAI-NANKING RAILWAY

The following figures of traffic returns (approximately) for the week ended November 23, were issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries earnings	Total.
	$	$	$
1912	43,583	10,306	53,889
1911	36,358	7,503	43,861
Increase	7,225	2,803	10,028
Decrease	—	—	—

For forty-seven weeks.

Year.	Passengers	Goods and Sundries.	Total.
	$	$	$
1912	2,010,286	368,765	2,388,051
1911	1,676,623	280,491	1,957,114
Increase ...	342,663	88,274	430,937
Decrease ...	—	—	—

For the week ended November 30:—

Year.	Passengers.	Goods and Sundries earnings	Total.
	$	$	$
1912	45,152	7,566	52,718
1911	36,150	5,700	41,850
Increase	9,002	1,866	10,688
Decrease	—	—	—

For forty-eight weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912	2,064,438	376,331	2,440,769
1911	1,712,773	286,191	1,998,964
Increase ...	351,665	90,140	441,805
Decrease ...	—	—	—

For the week ended December 7

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	43,153	10,567	53,720
1911	50,986	6,295	57,281
Increase	—	4,272	—
Decrease	7,833	—	3,561

For forty-nine Weeks,

Year.	Passengers	Goods and Sundries earnings.	Total.
	$	$	$
1912	2,107,591	386,808	2,494,480
1911	1,763,759	292,486	2,056,245
Increase ...	343,832	94,412	438,214
Decrease ...	—	—	—

Hokuriku Line.—The railway service between Nadachi and Itoigawa, Japan, a distance of some 16 miles, on the Hokuriku line was to be opened to the public on December 8. With the section opened the entire Hokuriku Railway will be ready for traffic except between Itoigawa and Aomi, about three miles, which will not be opened till next February, owing to difficulties of construction.

Kyoto Station—The Railway Board of Japan has a project to erect a new and enlarged station in Kyoto in place of the present one at an outlay of three million yen, which is included in the next year's Budget. The site of the new station will be a little to the south of the present one, and will cover about an acre.

Hokkaido Railway.—The express service on the Hakodate-Kushiro section of the Hokkaido Railway line, which was opened last June, was to be suspended on and after the 1st of December owing to the setting in of the snow season.

Japanese Government Railways.—The receipts of the Japanese Railway Board for the current year are calculated from the figures collected up to the end of October to show an increase of 8,000,000 *yen* over the estimated amount of 100,092,658 *yen*. The next fiscal year's estimate of revenue from the same source will therefore be placed at over 110,000,000 *yen*.

Tokyo-Narita Line.—The first section of the Keisei Electric Railway between Oshiage (Honjo, Tokyo) and Ichikawa, Chiba Prefecture, Japan, was opened to traffic on November 3. The line, which is to be extended to Narita in future, starts from Oshiage near the starting point of the Tobu Railway, and touching at Hikifune, Yotsugi, Tateishi and Magane, extends to Ichikawa. A branch line between Ichikawa and Shibamata was also opened the same day. Among noted places along the line are Konodai Hill, a famous old battlefield near Ichikawa, the peach orchards at Ichikawa, the Yoshino Garden at Yotsugi noted for iris, and other flowers, the Taishakuten Shrine at Shibamata, and the plum trees at Kinegawa, near Oshiage. The hand-car tramway between Kanamachi and Shibamata will be purchased by the company and converted into an electric line.

New Japanese Railway.—The Imperial Japanese Government Railway between Tsuruga (port for Vladivostok) and Shin Maizuru will not be opened before 1914, owing to engineering difficulties, several tunnels having to be bored. All land between the termini has been purchased and survey work is nearing completion. Construction began in October on the Kohama section, and work on the Tsuruga-Minami-Saigo section will begin before the end of year. The opening of this line will effect an extraordinary economic change in this region, hitherto only accessible by boat or long journeys overland.

SOUTH MANCHURIA RAILWAY

The account department of the South Manchurian Railway Company is now busy preparin an estimate of expenses for the fiscal year. It is expected that the large sum of yen 15,000,000 is needed to carry on the undertakings of new industries of the company, but that such an amount cannot be secured from the balance money from shares. Either new shares or debentures must be issued to make up the deficiency. The company, however, has not yet decided what steps to take, and it is necessary to secure the consent of the Government for the proposed expenditure for the fiscal year before new shares can be issued.

The Sonth Manchuria Railway was to distribute on December 12 to its shareholders according to the Shareholders' Register, as it stood on December 1, a sum of money amounting to half the annual dividend at the rate of 6%.

The coke factory, constructed at Chiencinchai on the plans drawn up by Mr. Suzuki, Manager of the South Manchuria Railway Company's Gas Department, has had all machinery and other interior equipments installed. The railway siding from the Fushun Colliery to the factory is not completed yet, and the unfinished work is likely to be resumed early in spring.

Accordingly the factory itself will not start operations before spring. The factory will be capable of putting out 10 tons of coke a day. The output is to be offered for sale among the Chinese at Mukden. Liaoyang, Yingkou, Tiehling Changchun, &c.

The principal works proposed to be undertaken by the South Manchuria Railway Company in 1913 are the construction of harbours at Dairen, and the improvement of rolling stock and tracks. The *Asahi* learns that the new works of the company will not be postponed—as seems to be believed by many—as the result of the negative financial policy of the Government. It is the bounden duty of the Company to perfect the railway accommodation in Manchuria, and works to this end cannot be allowed to be neglected even for a day, in order to develop the resources of Manchuria. For these reasons, it is confidently asserted that the Company will carry out its projected works, quite independent of the financial policy of the Government in Tokyo. In the event of funds at the command of the company falling short, the directors will not hesitate to issue the shares which are held in reserve.

The further extension of the market for Fushun coal has been occupying the attention of the Company as the output of coal increases. The Company is now shipping the coal to Korea and Formosa in addition to North China. The projected extension of sale to Japan Proper has been abandoned, as it is considered inadvisable to open competition with the collieries in Japan Proper and inexpedient for a semi-Government company to "oppress" private business companies. The Company has, therefore, decided to ship coal to South China and Singapore next spring. But when Fushun coal is exported to South China, Singapore, and other places, remarks the Osaka journal, competition will be entered upon with the collieries in Japan Proper, which make these places their principal foreign markets.

The South Manchurian Railway Traffic Returns for the month of November give Y. 1,760,198 being an increase by Y. 243,150 over the corresponding period of last year. The aggregate earnings since last April, the beginning of the present fiscal year, are Y. 10,064,584 which sum is larger by Y. 949,319 than the aggregate figure for the corresponding period of last year.

The 64 lb. rails which were used by the Russians in the construction of what now forms the main line of the South Manchuria Railway have been replaced by 80 lb. rails by the S.M.R. management in the section lying south of Mukden and another section between Szupingkai and Shuangmiaotzu. The same management has the 5 mile section between Changtu and Manching being replaced with 80 lb. rails during the present fiscal year. It will attend to the about 12 mile section between Manching and Shuangmiaotzu during the next fiscal year. The remainder will also receive its attention in the succeeding years.

The South Manchuria Railway designs to found a new slaughter house at Mukden, at the coast of $25,000, and intends to import and kill Mongolian cattle and thus to offer good beef to all markets in South Manchuria.

Kirin-Changchun Railway.—The *Manchuria Daily News* of November 21 reported that about 10 carloads of Tobacco leaves were arriving daily at Changchun by the Kirin-Changchun Railway, and were being transported to Mukden and Yingkou. One or two carloads of medicinal herbs and hemp were arriving daily at Changchun from the same source. About the same quantity of Kirin timber was arriving there daily.

The revised train schedule for the Kirin-Changchun Railway, came into operation from November 25 as follows:—

East Bound

	Express.	Ordinary.
Lv.—Changchun........	7.00 a.m.	2.00.p.m.
Ar.—Kirin	11.30 „	8.15 „

West Bound.

Lv.—Kirin	6.00 a.m.	2.40 p.m.
Ar.—Changchun........	11.10 „	7.20 „

The Korean Railways:—The railway authorities of the Government-General of Korea have ordered twelve locomotives of a new pattern from an American firm in New York. The *Seoul Press* learns that the same authorities, having found it necessary to increase the number of freight cars, are now having 165 cars constructed at the workshops at Yongsan and Cholyang. These cars are expected to be completed by the end of March next. By placing the new cars on the service the authorities hope to increase the transport capacity by about 20 per cent.

Seoul-Wonsan Railway. — The opening ceremony of the Yonchon-Cholwon section of the Seoul-Wonsan Railway, fifteen miles in length was successfully held on October 26 at Cholwon, in the presence of Count Terauchi, Governor-General. A special train was run from Nandaimon station carrying some two hundred guests specially invited for the occasion. The distance between Seoul and Cholwon is some 61 miles with ten intermediate stations, and is reached in four hours by train. It will be remembered, says the *Seoul Press*, that the distance was formerly barely covered in three days, the road being bad and the means of communication imperfect. It may also be noted in this connection that Cholwon is situated on a vast extent of highland, covering an area of some 69,000 *cho*, with a comparatively small population of only 27,000 forming 6,100 households. The train arrived at Cholwon at 1.30 p.m. and the guests were immediately ushered into a temporary saloon specially provided for the occasion. It was built up of railway sleepers and was an object of general approval as an excellent example of resourcefulness. After a short address by Dr. Ohya, Director of the Chosen Railway Bureau, His Excellency the Governor-General spoke for a while and proposed a toast which was heartily responded to. The guests were then entertained to a cold collation.

Kirin-Hoireng Line.—It is understood that Japan intends to proceed forthwith the construction of the Kirin-Hoireng Railway, which will be the last link in the military defences of Korea and South Manchuria.

Yalu Railway Bridge.—The suspension of the operation of the swing-bridge of the Yalu Railway Bridge to the reopening of the Yalu to navigation next spring was announced by the Government-General of Chosen on November 25.

Burma Railways Dividend. — The final distribution of 1½ per cent. is recommended by the Burma Railways on account of surplus profits for the year ended June 30, 1912. This, with the previous distribution of 15s. per cent., brings the total surplus to £2 5s. for the year, which with the guaranteed interest of £2 10s. makes a total yield of £4 14s. for the year, income tax being deducted before payments.

Railroad Manager Wanted.—Applications are invited for the position of general manager of the New Zealand Government Railways. The salary is $15,000 U.S. Currency a year, and the term of appointment five years. Further particulars and forms of application may be obtained from the High Commissioner for New Zealand, 13 Victoria Street, London, S.W., England. The New Zealand Government railway system includes 2,750 miles. The revenue in 1910 was $15,816,000 and the expenditure $10,550,000, the goods carried 5,490,000 tons, the passengers numbering 11,141,000.

The Tcheng-tai Railway.—According to the returns to September 15 last the earnings of the Tcheng-tai Railway (from Shihchia-chaung, on the Peking-Hankow line to Taiyuan-fu, the capital of Shansi province) are recovering from the effects of the Revolution. The line was commenced in 1904, and in October, 1907, was opened for traffic over its whole length of 151 miles. The receipts for 1910 were $1,756,493.46, whilst for 1911 they fell back to $1,416,699.61, though 1912 (to Sept. 15) saw a recovery of some $324,601.07 over the 1911 returns, the total for this financial year being $1,741,300.68. From September 10 to 15 the receipts from passengers carried were $14,278.90 whilst from goods the returns were $25,145.30.

Shantung Railway Company.—A Tsingtau despatch reports that the Shantung Railway Company will grant rebates on freight rates of from 20 to 40 *per cent.* from January next, in competition with the Tientsin-Pukow Railway.

The Hukuang Railway.—The Hunan section of the main line is again making progress. A party of British engineers left Tientsin on November 20 for the survey—interrupted by the revolution—near Chenchow. Mr. Tan Jen-feng, addressing the shareholders, argued that the expenditure of 6,500,000 (? $) on the short line already completed showed the need of foreign supervision. The Tutuh concurred and the shareholders applauded.

Freight Cars.—Telegrams from Shanghai, Chinkiang, and other places to the Board of Communications state that the number of freight cars on the various railway lines is far from sufficient for the traffic and urge strongly an increase in the numbers.

PERSONAL

Mr. T. Aiga, outgoing Civil Administrator, of Dairen was one of the oldest officials of the Kwangtung Government, having been appointed secretary as far back as 1905, preliminarily to the organization of the Kwangtung Government. In South Manchuria he first took charge of the Chinchou Branch of the Dairen Civil Administration. He demonstrated his executive ability by the extermination of powerful gangs of bandits which had been terrors to the northern part of the Leased Territory. The credit for paving the way to the complete elimination of brigandage from Kwangtung is due to his thoroughness in detail. He was subsequently transferred to the Ryojun Civil Administration as its chief, and then to the Dairen Civil Administration about a year and a half ago.

M. Cazenave, Manager of the Bank of Indo-China, left Peking on December 8 for Paris.

Col. B. Semenow, Assistant Military Attaché to the Russian Embassy at Tokyo, has been transferred to the Embassy at London, where he will serve for the next three years. Previously to his present appointment he was attached to a cavalry regiment at Warsaw. It is not yet known who will suçceed Col. Semenow.

Mr. Y. Tahara, Commercial Attaché to the Japanese Embassy in London, has resigned his post.

Mr. Nakamura, the President of the South Manchurian Company, accompanied by Mr. Inusaka, the manager of the company, started early in December on a tour of inspection to Changchun and Kirin in Manchuria.

The death is announced of Mr. Kawasaki Shozo, the founder of the Kawasaki Dockyard, Kobe, Japan. He was 76 years of age and was recently promoted to the junior grade of the 5th Rank of Honour by the Emperor in recognition of services rendered to the State.

A despatch from Bangkok states that Dr. Tokichi Masao, Japanese legal adviser to the Siamese Government, was promoted to the rank of Prince on the occasion of the anniversary of the accession of the King of Siam on November 11. Dr. Masao was at the same time honored with the Second Order of the Siamese decoration awarded to the Princes of the Blood and was accorded special treatment due to members of the royal family. He is the first foreigner who has received such high honor from the Court of Siam. Dr. Masao comes from Iyo Province. In his early youth he went to Kobe and studied English in an English school. Later he went to America where he graduated from Yale University. He returned to Japan and obtained a degree of doctor of law by presenting a thesis. He was for a time on the staff of the *Japan Times*. In 1897 he went to Siam, being engaged by the Siamese Government as legal adviser, which post he still retains. Dr. Masao has contributed invaluable services to the work of diplomacy and legislation of Siam, especially in connection with the enacting of various codes, thus laying the foundation of the new legislation of the country.

Mr. Francis O'Conner, United States Vice-Consul, at Tamsui, has resigned. Mr. J. W. Valentine, United States Deputy Consul-General, has gone to Tamsui to act temporarily until the Consul, Mr. S. C. Reat, returns from his furlough.

It is officially announced that Senor Pacheco, Mexican Envoy Extraordinary and Minister Plenipotentiary to Japan, has been relieved of his post and will shortly return home. Mr. M. F. Rebolledo, the First Secretary of the Legation will be appointed Acting Minister.

The Electricity and Gas Departments of the South Manchuria Railway Company have been amalgamated with the Electricity and Gas Works, with Mr. Y. Tanuma as General Manager. Mr. H. Amemiya and Mr. T. Suzuki have been appointed Superintendents of the Electricity and Gas Departments respectively.

Mr. M. Numata, Director, who was Superintendent of the Electricity Department, has been released from his post.

Mr. A. A. Penney, one of the oldest foreign residents of Dairen left that port for good on December 12. For the last three years he had been connected with Messrs. Samuel & Company. He severed his connection with the firm at the end of November.

As the result of the recent election of the Auditors of the South Manchurian Railway Company on the expiry of the term of office, the following gentlemen were elected:—Mr. T. Nakahashi (re-elected), Mr. K. Kawakami, (re-elected), Mr. K. Magoshi (re-elected), Mr. S. Iwashita (re-elected), Mr. S. Ohashi (newly elected). Mr. Ohashi, who is the proprietor of the "Hakubunkan," one of the largest publishing companies of Japan, has succeeded Mr. H. Taki, of Nagoya, who resigned.

Mr. S. Hiroi who has been manager of the Hongkong branch of the Osaka Shosen Kaisha has been transferred to the head office at Osaka to act as traffic manager of the coasting lines department. Mr. Zoku Kamiya has been appointed manager of the Hongkong branch in his place.

A Presidential Mandate has been issued promoting the following to the rank of field-marshal:—The Manchu General Yin Chang, Chang Kweiti, the veteran Chinese General; and Baron Feng Koo-chang, who was recently appointed Tutuh of Chihi.

Mr. Tan Jen-feng, Director-General of the Canton-Hankow Railway, has recommended that Mr. Cheng Ming-chao be appointed Director of the section between Wuchang and Yochow; Mr. Chen Yu-lung, Director of the section between Yungchow; and Mr. Jeme Tien-yu, Director of the last section between Yungchow and Canton. It is reported that the Minister has complied with the request and that the appointments have been made accordingly.

Field Marshal Huang Hsin, of revolution fame, is stated to have accepted the post of Director-General of the Canton-Hankow Railway.

Mr. Hyoji Futakame, Acting Consul-General at Vladivostok, has been transferred to Moscow, and Consul Motonobu Nomura has been ordered to take his place at Vladivostok.

Messrs. Murao, Hida, Yamanishi and Hatakeyama, experts and officials of the Department of Communications, have been ordered to Great Britain, the United States and Germany with instructions to investigate works connected with electricity and post-office business for a term of one year.

Baron Hayashi, Ambassador to Italy, will be transferred to Austria, the present Minister being placed on the list of diplomats expectant, and Baron Ijuin, Minister to China, will be promoted to the post of Ambassador to Austria, being succeeded by Mr. Yamaza, Councillor of the Gaimusho, who is on a tour of inspection through China.

Mr. Chuji Kajiwara, formerly Chief of the Osaka Branch of the Bank of Japan, who was made Superintendent of the London branch of the Bank has left for his new post.

Mr. Frank Dundore Arnold, the new Third Secretary of the American Embassy, has arrived in Tokyo.

It is reported that Herr Ballin, the managing director of the Hamburg-Amerika Linie, is to make a visit to the Far East early next year.

Mr. F. Hanny, Chancellor of the Austro-Hungarian Embassy, has retired from service and will not go to Japan.

The appointment of Mr. Hans Karl Chamalman as honorary Vice-Consul for Japan resident in Vienna has been announced.

Baron Othon de Biegeleben, First Secretary of the Austro-Hungarian Embassy in Tokyo, has been ordered to another post which is not yet officially announced.

King George has approved the appointment of Sir William Conynham Greene, K.C.B., to be his Majesty's Ambassador Extraordinary and Plenipotentiary at Tokyo in succession to Sir Claude MacDonald, G.C.M.G., G.C.V.O., K.C.B.

Captain Hubert Brand, the new Naval Attaché of the British Embassy in Tokyo, arrived by the P.M. S.S. *Siberia* just in time for the Naval Review.

Mr. George H. Murray has been appointed American Consul-General-at-large in the Far East, in succession to Mr. F. D. Cheshire, who held the office from July 1906 until the date of his recent appointment as Consul-General at Canton.

Sun Wu (the man credited with starting the revolution at Wuchang) is said to have been appointed by the Central Government as the Director General of the Hanyehping Coal Mine Company.

Tsang Tien-yu, the Chinese chief engineer of the Canton-Hankow Railway, will proceed to Hunan for another survey of the railway line and for consultation on railway problems.

Mons. de Saint Pierre, manager of the Peking Branch of the Banque de L'Indo-China, in succession to Mons. Casenave, was expected in Peking early in December.

The *Sinwanpao* reports that Mr. A. W. U. Pope, General Manager of the Shanghai-Nanking railway, has been recommended to President Yuan Shih-kai for a decoration in recognition of his services to the Republic of China.

Mr. Pope left in the middle of December for a visit to Japan, and during his absence Mr. E. R. Morriss was appointed to officiate as General Manager, and Mr. J. D. Read as Traffic Manager.

Mr. William Schwanhauser, Chief Engineer of the International Steam Pump Company, has returned to America from a three months trip to Europe, visiting England, Germany and Russia.

While in London he closed a contract with S. Pierson & Son for the entire pumping equipment required for a new oil pipe line now under construction in Mexico. The pumping engines will be furnished by the Fred M. Prescott Steam Pump Company of Milwaukee, Wis., and the condensers and auxiliaries by Henry R. Worthington.

Mr. J. F. Oiesen, the Commissioner of Customs at Tientsin, has been offered an important post in connection with the Salt Gabelle management and collection, at the wish of the Financial representatives there of the Six Power group.

INSURANCE

Fire Insurance Business in Japan.—According to the latest returns published by the Japanese Department of Agriculture and Commerce there are at present twenty-two fire insurance companies, five marine insurance companies, seven transit insurance, one credit insurance company and one engine and steam boiler insurance company. The capital of these companies is:

Fire Insurance	Y. 41,000,000	(11,052,537 called)
Marine Insurance	10,050,000	(3,000,000 called)
Transit „	32,000,000	(8,300,000 called)
Credit „	5,000,000	(1,250,000 called)
Engine boiler Insurance ..	500,000	(125,000 called)

The premiums these companies get during one year is:

Fire Insurance	Y. 8,783,687
Marine Insurance	6,622,422
Transit „	149,724
Credit „	20,711
Engine „	27,000

TRAMWAYS

SHANGHAI TRAMWAYS

The returns of the Shanghai Tramways (Foreign Settlement) for the week ended November 27 are as under:—

	1912.	1911.
Effective receipts after deducting loss by exchange)	$16,070.65	$13,826.52
Passengers carried	817,549	667,049
Car miles run	53,565	50,195

The loss by exchange of subsidiary coinage for the week was equal to 23.04 per cent. of the gross cash collected on the cars as compared with 24.12 per cent. for the corresponding week last year.

For the week ended December 4:—

	1912.	1911
Effective receipts (after deducting loss by exchange)	$15,814.64	$14,206.83
Passengers carried	803,197	690,978
Car miles run	52,904	49,804

The loss by exchange of subsidiary coinage for the week was equal to 23.04 per cent. of the gross cash collected on the cars as compared with 24.45 per cent. for the corresponding week last year.

For the week ended December 11:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	$15,900.69	$13,380.37
Passengers carried	805,846	648,711
Car miles run	52,635	48,470

The loss by exchange of subsidiary coinage for the week was equal to 22.82% of the gross cash collected on the cars as compared with 24.33% for the corresponding week last year.

For the week ended December 18:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	$14,610.10	$14,947.37
Passengers carried	737,247	729,446
Car miles run	50,878	50,885

The loss by exchange of subsidiary coinage for the week was equal to 22.91% of the gross cash collected on the cars as compared with 24.18% for the corresponding week last year.

Nagasaki Tramway Scheme.—The Nagasaki Electric Tramway Company scheme is making progress, but very slowly. It is now reported that Mr. Masuda, of Kobe, who is the principal promoter, will go to Nagasaki shortly, having made satisfactory arrangements for the flotation of the Company. The capital required is Yen 1,200,000; the working expenditure is estimated at Yen 42,756 and the receipts—a difficult matter to forecast—at Yen 207,360, enabling a dividend of eleven per annum to be made. Power will be obtained from the Electric Lighting Company.

Manila Street Railway.—The Governor-General has approved the plans for extension of the street railway through the port area district. The manager of the company, Mr. Stone, suggested that the part of the extended franchise covering the streets from Pier 5 to the intersection of Second street and Muelle Tacoma should be temporarily approved, in order that the line might be extended down the water front, to accommodate the employes of the Earnshaw slip, the I. P. A. employes, the employes of Engineer island, and the quartermaster's department. This was done, and the railroad company is now at work extending the tracks.

Yokohama Tramways.—The City of Yokohama will soon have two electric tramway companies. The Yokohama Electric Tramway Company is now pushing its extensions in Yokohama, and has already eight miles of lines in the city. Another company, which has already received a charter from the Yokohana Municipal authorities, will commence work early next year in Yokohama. It has already begun operations in Meguro, whence the line runs to Yokohama via Hodogaya. The main station in Yokohama will be built at Takashima-cho, whence the lines will extend to Tobe, Theatre street, and the Bund, where the shore along the foot of the Bluff as far as Negishi and Honmoku will be reclaimed. The establishment of the two companies in Yokohama will naturally result in keen competition.

Some time ago, the Yokohama city authorities approached the Yokohama Electric Tramway Company, and requested it to pay a certain percentage of their gross receipts into the Yokohama city office as taxes. Owing to the failure of these negotiations, it is reported that the Yokohama City authorities will impose a tax of two yen on each electric pole, and twenty sen on each six feet of rail. The amount estimated in receipts is 5,753 yen.

Tientsin Tramways.—The *China Critic* (Tientsin) is informed that a group of Japanese Financiers have been endeavouring to buy the Tientsin City Electric Tramway's Co. Ld., which was under offer to them; but the price asked appeared to them too high, so the deal was 'called off,' for the present. Other negotiations are, however, likely to ensue.

Bangkok Tramways.—Mr. H. Sels, the Belgian tramway expert who visited Bangkok in October, on behalf of a syndicate which is considering the acquirement of a controlling interest in the Siam Electricity Co., strongly insists upon the necessity of putting down a double tramway track, at least upon the Bangkolem line. With a single track, he says, it is not possible to maintain a fair service upon so extensively used a line. The Government is working hard for the improvement of Bangkok and Siam generally, and already, aided by the aptitude of the Siamese people to learn new things, they have had much success. But time is money, and in order to make more money it is necessary for the people to have a continuous tramway service, and not one with a wait at every siding. It would be a good thing for the Siamese Government to order the Electricity Company to put a double track down.

Shanghai Chinese Tramways.—In January, it is expected, work will begin for the laying of tramways along the Chinese Bund at Shanghai. Part of the material has already arrived, and work on the car-sheds, which are stationed near the station of the Shanghai-Hangchow Railway, is now being undertaken by the *concessionaries* themselves, the "Compagnie Chinoise de Tramways." The track will run along the Chinese Bund, from its junction with the French Concession, practically as far as the Arsenal and the railway station, the line being single with frequent loops. Power is to be supplied from the electric works at present at Nantao, where the plant has been augmented. Messrs. Siemens have the contract.

Seoul (Korea) Tramways.—A Seoul report says that the Governor-General has announced a plan of street improvements for the peninsular capital. Nineteen streets are to be changed turning them into thoroughfares of varying width from 48 to 180 feet, at a total outlay of 13,000,000 yen. The scheme will be put into practice commencing next year as a work that will take some time to complete. The streets involved being all situated north of Kogane-machi, which is mostly inhabited by Koreans, the center of commerce where the Japanese have hitherto been concentrating their attention, will gradually be removed. Shrewd men of business are said to be already trying to buy up the land where street improvements will be introduced.

Hongkong Tramway Company.—The Hongkong Tramway Company announced that an interim dividend at the rate of 5% per annum free of Income Tax for the six months ended 30th June, 1912, would be paid on and after the 23rd November, 1912, to all Shareholders on the register on the 16th November.

COMPANIES

Crown Hardwood Company.—This company, which is capitalized at $1,000,000, U.S. currency, has been organized, and authority to engage in business in the Philippine Islands was granted on November 13 to the incorporation. Capitalists from the United States and British Columbia are financing the concern. The concession was granted over two months ago and a modern lumbering enterprise of the first magnitude with logging equipment, railway, saw mills and planing machinery of the most efficient and up-to-date type will be installed at once.

The concession, which embraces an area of 455 square miles, is located on the Ragay Gulf, near Gumayangan, and principal promoters and incorporators are J. H. Kern, A. J. McEchran and E. J. Lane, of Manila.

This immense forest tract was advertised for competitive bids several months ago, and the award was finally made to E. J. Lane, who has associated with him several wealthy timber operators, from the Northwest. Among the principal timber species which will be cut are yacal, guijo, apitong, lauan and tanguile. A minimum of seven miles of railway will be installed at once, equipped with 20 sets of standard gauge logging trucks and the necessary logging locomotives.

Within one year a sawmill with a capacity of at least 50,000 board feet will be in operation and within 18 months this capacity must be increased to a daily capacity of 100,000 board feet. The concessionaire is bound to invest within 18 months the sum of P. 200,000 in providing tugs, lighters, barges and other equipment for water transportation.

Dairen Fertilizer Manufacturing Co.—The Dairen Fertilizer Manufacturing Co. has completed the construction of the plant and installation of machinery. The housing accommodation for its employees is nearing completion. The management hoped to celebrate the completion of the plant early in December.

Hokkaido Colliery & S. S. Co.—The Hokkaido Colliery and Steamship Company held a special meeting on November 29. The Mitsui company sent the following proposal to the meeting: that 10 yen be paid on the new shares and when this is paid to make one share out of two, to reduce the capital to 13,500,000 yen, and no dividend for five years after the adjustment. Then to issue fresh preferential stocks of 6,500,000 yen with interest of seven per cent. The second proposal is; let 10 yen be paid on the new shares and if a good opportunity presents to make two shares into one, reduce, the capital by half and pay no dividend for seven years; issue new preferential shares of 6,500,000 yen with interest of eight per cent. The committee discussed the two proposals but no decision was given as the members were divided in their opinions.

Japanese Gas Companies.—Various gas companies which are connected with the Japan Gas Company have all obtained more or less satisfactory results. The

companies which have already wound up accounts are as follows:

	Net Profit.	Dividend %
Kagoshima	7,599,818	9
Kumamoto	8,006,533	10
Omuda	2,442,735	6
Kure	10,481,535	6
Nakagawa	3,445,218	5
Himeji	4,290,289	6
Niigata	3,901,025	6
Shimonoseki	11,435,545	12
Chiba	1,544,135	—
Hakata		9

The Japan Gas Company held its general meeting on December 18th and adopted the following accounts.

Net profits	35,664
Brought from the previous term	17,285
Legal reserve	1,800
Bonus to officials	3,500
Reserve for pensions to retired officials	1,000
Dividend (7 per cent.)	28,000
Carried next term	18,650

Naigai Men Kaisha.—The Naigai Men Kaisha (Domestic and Foreign Cotton Company) of Osaka, Japan, has decided to double its present capital of 2,500,000 *yen*, and as a preliminary measure, has called for the payment of the last instalment on its old shares. The shareholders remaining registered on December 1, were to be entitled to new shares of the same number as their old shares.

Burma Oil Company.—The Burma Oil Company has declared an interim dividend on the first preference shares of £1 each at the rate of 7 1-5 pence per share under deduction of income tax; on the second preference shares of £10 each at the rate of six shillings per share; and on the ordinary shares at the rate of one shilling per share free of income tax.

Yokahama Electric Light Company.—A general meeting of the Yokohama Electric Light Company was to be held on December 21 at 1 p.m. when a dividend of 11 per cent. was to be declared. The gross receipts of the present year are Yen 376,630, of which 19,415 will be carried over to the following year.

ROADS AND BRIDGES

Laoag River Bridge. — The Bureau of Public Works, Manila, has under contemplation the construction of a bridge over the Laoag River, in Ilocos Norte, Philippine Islands. Sealed proposals for the construction of the sub-structure of this proposed bridge were received and opened on November 13 at the Bureau of Public Works. The bridge when completed will consist of seven 160 foot spans, the piers and abutments to be of concrete and the superstructure of steel, the roadway being sixteen feet in width.

The bids received have been taken under advisement, and were as follows: Atlantic, Gulf and Pacific Company, P. 68,670: A. F. Allen P. 64,390: Daniel Galza, P. 63,000.

Candon Bridge.—Only one bid was received for furnishing material for the Candon bridge at Ilocos Sur. The bid was made by the Atlantic, Gulf and Pacific Company, which offered to furnish all fabricated steel and field revets for one 49.34 meter Pratt truss span and miscellaneous fabricated materials for 18.8 centavos per kilo. The bridge in which the material is to be used is located on the Candon river on the Vigan-South boundary road.

MINING

Fushun Collieries.—It is stated that, as the daily outport of the Fushun Colliery is increasing, almost beyond the demand for ordinary and shipping purposes, the management has decided to erect a plant at Chienchinchai (colliery town) for the manufacture of sulphate of ammonia, and the extensive utilisation of Producer Gas: for both of which there is a large demand in Japan at profitable rates. It is stated that 100 tons of Fushun Coal produce 5 tons of sulphate, in addition to a large quantity of Producer Gas.

A new market has been found for Fushun coal in the Philippines, the Manila agency of the Mitsui Bussan having just completed a contract. In addition to its regular markets at Shanghai and Hongkong, the prospects of the export of Fushun coal to the Straits settlement are now very bright. Much difficulty is being encountered, however, in chartering vessels owing to the demands of the bean trade.

Gold Mine in Shantung.—During the late regime the gold mine of Shaoan Shan in the Prefecture of Chih Chou, Shantung, was operated exclusively under official control, and proved a losing concern. Mr. Liu Shenchou, one of the gentry of the Prefecture, has petitioned the Shantung Provincial Government to permit him to start operations on the mine on his own resources, as he is confident of its success if worked as a private enterprise. The Tutuh has telegraphically represented the case to the Ministry of Industry and Commerce and is awaiting for instructions.

East Batan Coal Mine.—The property of the East Batan Coal Mining Company was sold by auction at Manila on November 20, and was bought by the Government for Pesos 21,000.

Mineral Production in Japan.—The Japanese Department of Agriculture and Commerce gives the following figures relative to the production of minerals for September and nine months of the year:—

	September	Since Jan.	Compared with 9 months 1911.
Gold momme..	114,236	871,540	+68,786
Silver momme	3,407,123	28,740,112	+2,470,968
Copper kin.....	7,090,345	66,576,640	+7,208,629
Iron kan.......	1,563,696	12,425,104	+512,681
Coal ton.......	1,334,791	12,416,006	+1,247,222
Petreleum koku	116,886	1,011,067	−80,700
Sulphur kin....	7,316,603	59,500,940	+5,106,882

Momme—.1325 ounces, Kin—lb., kan 8.28 lb., koku—4.9629 bushels

According to the returns published by the Japanese Department of Agriculture and Commerce the total amount of the mineral output during 1911 was *Yen* 106,071,014 in value, which is an increase of *Yen* 5,817,438 over 1910. The comparison between the output for 1911 and that for 1910 is as follows:

	1911	Comparison with 1910
Gold	6,050,497	87,691 (inc.)
Silver..	4,761,952	134,536 (dec.)
Copper	27,119,917	1,300,648 (inc.)
Iron	2,575,514	220,159 (dec.)
Coal	55,006,501	3,930,103 (inc.)
Petroleum.. ..	6,888,552	8,081 (inc.)
Sulphur	1,271,672	223,908 (inc.)

Waichow Mines.—General Lung Chai Kwang having previously invited the co-operation of Chinese merchants for opening up the mines in the district of Waichow, Kwangtung, it is now reported that his project will soon be launched. General Lung recently visited Hongkong to deliberate with the merchants there on the steps to be taken.

New Gold Mine at Sado.—The output from the Aikanea gold mine in Sado has recently been reduced and its value in future had begun to be doubted. However, the mining department of the Mitsubishi Co., has discovered a new mining area which produces excellent gold and is very rich in the mineral. The new area is situated at the side of the Nyugawa at Takachimura, six *ri* distant from the Aikawa main mine. The only defect is that it lacks facilities of land and water communications. The proportion of gold contained in the area is 4—100,000ths, and silver 3—10,000ths. By this discovery the Aikawa mining business, which was gradually declining will be restored more or less to its former prosperity.

Mining Industries in Fukien.—A number of wealthy merchants who have returned from abroad are taking an active interest in the mining industries in Fukien. Investigation parties have been organized to travel through the province in search of the whereabouts and kinds of mineral mines, and steps have been taken to organize a large mining corporation with sufficient capital to make it a success, says the *Peking Daily News*. The mines at Chenho, the tin mines at Hsiyanytao, and the iron mines in Lungpenchow will be operated as soon as the Fukien Government has given its sanction and the necessary arrangements can be made.

Gold in Federated Malay States.—The quantity of gold exported from the Federated Malay States in October was 1,022 ounces, making the total exported for the ten months of 1912, 10,077 ounces.

Model Mining Operations in China.—During the late Ching Dynasty, the Taotais of Industries in the provinces were under instructions to submit mining charts to the Central Government for reference. The Chief of the Mining Department in the present Ministry of Industry and Commerce is strongly in favour of the practice, and has been making plans to divide the country into several mining districts over which special directors will be appointed. One of the important duties of the directors will be to operate a model mine with most up-to-date machinery, so that the people may learn the scientific methods of mining, and the much needed training may be thus procured.

Shantung Mining Company.—At the general meeting of the Shantung Mining Company, Limited, in Berlin, the shareholders resolved to make an offer to the Shantung Railway Company for the cession of their enterprise in one block against new shares of the latter company to the nominal value of m.5,400,000, these shares participating in the profits from Jan. 1 next. It is generally expected that the railway company will avail itself of this offer, and, in order to effect the proposed payment, will increase its share capital from m.54,000,000 to m.60,000,000. The chairman declared that m.6,000,000 to m.7,000,000 would be necessary to write down the plants to their real value. The first six months of the current year had given a profit of m.424,000, but it would be impossible to extinguish the existing loss of m.1,237,111, and to reduce the debts. The iron ore mines can only be exploited by the railway company in a remunerative manner. Telegrams received in Shanghai during November stated that the offer had been accepted.

The total value of steamers imported into or built in Japan during 1912 shows an increase of over Y.5,000,000 or 40 per cent. over the corresponding period of last year.

Manila is to have a new theatre, which is to be erected at a cost of about P. 200,000.

IRON AND STEEL WORKS

The Hokkaido Tanko.—The Committee appointed to investigate the affairs of the Hokkaido Tanko iron foundry seems inclined to break away from the arrangement with the Muroran Steel Works, which at present is the chief source of loss to the colliery company especially in view of the fact that there is no written agreement. The capital already sunk in the foundry scheme exceeds yen 1,000,000, and another million is required before satisfactory results can be expected. The foundry is closed down for the present, and yet 1,500 yen a month is being spent in its upkeep. The foundry was built specially to supply material to the Steel Works. The fact that the Tanko would have been a prosperous concern to-day if it had attended exclusively its business of coal mining is weighing very heavily on the Committee and it is believed to strongly favor any sacrifice in preference to continuing the foundry work.

Iron Foundry in Manchuria.—According to the *Asahi*, one of three smelting furnaces to be erected at the Pengchihu iron foundry in Manchuria near Liaoyang, which has been started by Messrs. Okura & Co., Tokyo, has been completed and the manufacture of pig iron is to be started shortly. The materials for the construction of the smelting furnace have been supplied by the Imperial Iron Foundry at Wakamatsu, and all the pig iron produced at the iron foundry in Manchuria is to be delivered to the Wakamatsu foundry. When the Pengchihu foundry is completed, the the annual output of pig iron is estimated at 120,000 tons, representing Y. 4,800,000, in value.

Tsingtau Iron Works.—It is reported that the Germans at Tsingtau intend to open iron works in which Chinese capital will be allowed to participate. It is proposed to start upon a a large scale, with a capitel of ten million dollars, to work the iron coming from Chinlingchen, which is near the Shantung Railway.

HARBOURS WATERWAYS AND WHARVES

New Pier at Dairen.—The new pier at East End at the east of East Quay, Dairen Wharves, intended for the discharging of inflammable goods will be completed in September, 1913. This pier will be built of steel trusses in the fore part where ships are to be berthed in 28 feet of water, the remainder being constructed mostly of stone. When completed, this pier will be 1,750 feet long, and will obviate the clumsy task of discharging oil by lighters, since any steamer bringing oil, say, for the Standard Oil Co. will be able to pump her cargo into the piping which connects with the tanks at the Company's Oil Depot.

The Tungting Lake.—A Hankow dispatch of November 21 states that the Governor-General of Honan has proposed to start the dredging of Tungting lake, as the sand at the bottom of that lake often causes floods in neighboring regions. Vice-President Li Yuan-hung has approved the proposed scheme.

BUILDING

Reconstruction of Hankow.—The members of the Provincial Assembly at Wuchang have held a conference to discuss the articles of the Dollar loan contract and the proposal made by a representative of the Chinese settlers abroad that lands in Hankow be purchased and houses rebuilt with their capital. The amount of the chief engineer's salary and the other expenditures in the Hankow Reconstruction office have also been fixed.

WATER SUPPLY AND IRRIGATION

Irrigation in Iloilo.—The installation of the Santa Barbara irrigation system in the province of Iloilo, to cost when completed P.760,000, has been authorized and an allotment of P. 250,000 made available for immediate use. The system will accommodate an area of 4,000 hectares of cultivated land and double its producing capacity at a cost per hectare per annum of P.4.60. The construction will include 106.6 kilometers of main canals, main distributing canals, laterals, structures to bring the water from the Santa Barbara River at a point one and one-half kilometers below the Philippine Railway Bridge for the irrigating of 4,000 hectares in the municipalities of Santa Barbara, Jaro and Leganes.

Swatow Waterworks.—In connection with the new Swatow waterworks scheme now in progress, several matters have been giving trouble lately. It appears that considerable difficulty is being experienced in finding a satisfactory foundation for the large cofferdam now in course of construction. The ground in the locality is of soft mud running to a great depth, and although the engineering difficulty is not insurmountable, the cost will run to a good deal more than was at first calculated. Small property owners, too, are obstructing progress along the pipe line by demanding a considerable higher figure for the ground than it is worth, or than the company feel inclined to pay.

FINANCIAL

China Deposits in German Banks.—It is reported that Chinese deposits in the German bank at Tsingtau amount to over 17 million dollars, while Chinese deposits in other foreign banks at Hongkong, Shanghai, Tientsin, Peking amount to several hundred million of dollars.

Hupeh Loan.—It is reported that the Hupeh Government has concluded an agreement with a certain American Bank for a loan of Tls. 16,000,000 with interest at the rate of six per cent. per annum, Tls. 5,000,000 will be appropriated for the repayment of other loans, and the payment of Boxer Indemnity; Tls. 5,000,000 for the military administration; Tls. 6,000,000 for industrial enterprises.

Chinese Domestic Loan.—The central Government in Peking is reported to have decided to issue domestic loan bonds to the amount of Tls. 100,000,000 with interest at the rate of eight per cent. on the security of the national taxes. The repayment of these loan bonds will commence in the second year and will be completed within six years.

Bank of Formosa.—At the last half-yearly meeting of the Taiwan Ginko (Bank of Formosa) a dividend at the rate of 10 per cent. per annum was declared. The amount of gross profits for the half year ended 30th June last was Yen 3,122,088, and the balance brought forward from last account Yen 210,424. The net profit for the half-year amounted to Yen 513,391, and Yen 210,316 was carried forward to the next account, after allowing for the payment of dividend, bonus to employees, etc.

The subscribed capital of the bank is Yen 10,000,000, and the Reserve Fund 2,940,000, including Yen 170,000 added from the profits of the past half-year. The notes of the bank in circulation total Yen 20,017,376 current and and other accounts stand at Yen 38,307,682: and Bills Payable, etc., Yen 3,811,479. Among the assets are the following sums: Loans to Government Yen 5,005,590: Bills discounted, Loans, etc., Yen 45,576,505: Government Bonds Yen 6,739,242: Bullion and foreign money Yen 4,305,579; and capital uncalled Yen 3,750.00.

The Franco-Japanese Bank.—The Japanese branch of this Bank was registered by the Department of Finance at Tokyo on November 12.

The Advisers to the Bank, Baron Shibusawa, Messrs. Hayakawa, Mimura, and Mishima and Directors Dr. Soeda, Messrs. Watanabe and Murata met on November 21 in connection with the business of the Bank. It was decided that the Tokyo Branch of the Bank can independently engage in business without being under the control of the Industrial Bank of Japan and that the Japanese shareholders of the Bank be treated as a banking corporation. It is understood that this decision was wired to Paris for sanction.

Sino-Belge Bank.—The Sino-Belge Bank, held a general meeting at Brussels on November 20, Baron Baeyens presiding. The balance sheet to June 30, 1912, shows a profit of 1,188,687f., which represents a marked improvement on the previous financial year. The dividend has therefore been increased to 5 per cent. The profit has been distributed as follows:—

	Francs.
Depreciation fund for Peking and Cairo branches	33,616.01
Various depreciation accounts	65,000.00
	98,616.01
Legal reserve	47,900.55
Special reserve	150,000.00
Provision for license	10,000.00
Statutory allocations	93,138.75
Five per cent. dividend	750,000.00
Carried forward	39,031.98
	1,188,687.29

The official report, which was approved, contains an interesting paragraph concerning the commercial development of China. It is said that the Republican régime will be greatly beneficial to the country and that reforms will be carried out which will stimulate the regular development of natural resources, together with the productive power of its huge population.

The first task is the reorganisation of the finance of the country. The Government will have to raise loans abroad to arrive at that end. The Sino-Belge Bank has taken part in previous financial operations, and the Peking branch, formed during the present financial year, is rendering excellent services.

The local troubles have more or less paralysed commercial exports and imports. Many Chinese banks remain closed, and the capital has increased the cash holdings of foreign banks. When the situation becomes normal commercial transactions will not fail to resume a corresponding improvement.

The reports adds that during the last financial year a branch has been established at Cairo, and its activity fulfils the hopes of the board.

PUBLIC WORKS

Shaokangtzu Drainage System:—The construction of a drainage system in Shaokangtzu (Chinese Quarter of Dairen) was put in hand early last June, and about 30% of the work has already been finished. This system will be 39,000 feet in total length, when all is completed about May next year, and will cost about Y.83,000. The authorities are planning to supplement this system with gutters to be constructed along both sides of the streets at an outlay of about Y.50,-60,000.

Federated Malay States.—The total number of miles of metalled cart roads in the States of Perak, Selangor, Negri Sembilan, and Pahang at the close of 1911 amounted to 1,987 miles; of unmetalled cart roads, 233 miles; and of bridle roads and paths, 1,542 miles. This shows

a substantial increase on the mileage in 1910, and it will be still further increased during the current year. In Pahang alone there is a stretch of 149 miles under construction, while in Perak and Selangor additions would have been greater in 1911 had it not been for abnormally wet weather.

LIGHT AND POWER COMPANIES

Malacca Electric Co.—At the statutory meeting of the Malacca Electric Company at Singapore, Mr. C. E. F. Sanderson said the flotation was very successful and good progress in construction was being made. It was hoped to be in a position to supply current in November, although the work might be delayed by the dock strikes in England. They had made an agreement to supply the New Club, Malacca, with current for three years, and it was almost certain the company would be required by the municipality to undertake street lighting. They had every reason to anticipate that as soon as the supply commenced a good demand for current, would be experienced.

Electricity Works at Tientsin.—It is stated that the General Electric Company of China, Limited, has secured an important contract, against severe competition for the electric lighting plant for the Japanese Electricity Works Extension in Tientsin. The plant will consist of two Belliss and Morcom engines direct coupled to Witton continuous current generators, which are manufactured by the General Electric Co., Ltd., works in Birmingham.

GENERAL NEWS

Foreign Industries in China.—The Japanese *Official Gazette* of November 29 published the text of the treaty signed between Japan and Russia at Tokyo on June 23rd last, which will go into effect in the spring of 1913. The treaty is designed for the mutual protection and enforcement of the powers of ownership over the industries of the high contracting parties and their nationals in China.

Chinese Engineering Association.—The rules for an Engineering Assocation, whose object is the study and discussion of works and projects in China has been, it is stated, drafted out by a prominent engineer in Kwangtung and submitted to the Tutuh at Canton for approval.

Brazilian Colonization Company.—Under the auspices of Barons Shibusawa and Kondo and Mr. Nakano, President of the Tokyo Chamber of Commerce, a conference was held recently at the Tokyo Chamber of Commerce building, with regard to the proposed Brazilian Colonization Company, which is to be organized for taking over the special privileges from the Tokyo Syndicate for obtaining uncultivated lands in Brazil, which the Brazilian Republic offers. A great number of capitalists in Tokyo and Yokohama were present to consider the scheme.

Great Britain and Japan.—By an exchange of diplomatic notes which took place between the British Ambassador and the Japanese Minister for Foreign Affairs on the 31st of October, it was notified on November 4 in the Japanese *Official Gazette*, that the fees charged for the endorsement of the place of production of goods intended for export from Japan to Britain and *vice versa* would be abolished on and after the 1st of January next.

Hongkong Dredger.—It is understood that the Kowloon Dock Co.'s dredger "Canton River" has been sold to the New South Wales Government. She was to leave sometime in December and goes down under her own steam in charge of Capt. Weare of the Dock Company.

Silk in Japan.—The Japanese Department of Agriculture and Commerce has published a statistical report on the export of Japanese silk, according to which this is a record year since silk began to be exported from Japan. The figures as they stood at the end of October every year since 1906 are as follows:—

	Yen
1906	87,066,284
1907	106,257,454
1908	89,303,186
1909	103,679,714
1910	109,007,975
1911	111,762,863
1912	117,281,000

Japan - Austro - Hungarian Commercial Treaty.—The new treaty of commerce between Japan and Austria-Hungary has been signed at Vienna by the plenipotentiary representatives of the high contracting parties.

Chino-German Refinery.—It is reported that a German firm has contracted with the Chinese Ministry of Commerce and Industry to promote a Chino-German beet sugar refinery company for which the firm will supply machinery costing 600,000 Taels and also a working capital of 200,000 Taels, whilst China is to provide land in Manchuria of an equal value.

Insurance in Japan.—The conference of Japanese Insurance Companies is now feeling acutely the effect of the vigorous competition carried on by the foreign insurance companies doing business in Japan. The conference has a conventional rate of premium which is rigidly binding upon the members, who are, therefore, not at liberty to use their own discretion, even in exceptional cases. The Japanese companies are thus exposed at every step to the danger of breaking their own rules and penalizing themselves, for which reason the committee of the conference is now considering the relaxation of the existing rules within reasonable bounds.

NAVAL

New Japanese Cruiser.—The Japanes armored cruiser *Hiyei* was launched at the Yokosuka Naval Yard on November 21st at 2 p.m. the sea then being at high tide. The new cruiser is 23,500 tons and has a speed of 25 knots. The vessel will carry eight 14 inch guns and sixteen 6 inch guns.

SHIPPING COMPANIES

Kobe-Sourabaya-Line.—A charter was granted on November 11 to Messrs. Keizo Oaki, Jujiro Harada and Kankichi Itatani for opening a new steamship service between Kobe and Sourabaya, with Moji, Hongkong, Singapore, Batavia, and Samarang as regular ports of call. It is provided that the steamers of the line will regularly call at those ports on outward voyage, while on the return voyage they will directly sail for Kobe from Sourabaya calling only at Hongkong. On the outward voyage the liners may call at Keelung on their way from Moji to Hongkong. Further it is provided that the liners may extend their voyage to Yokohama from Kobe and to other ports in the Neitherland Indies from Sourabaya. The service will be monthly at present. The charter takes effect from November terminating in March, 1915.

Toyo Kisen Kaisha.—The *Nichi Nichi* is responsible for the statement that the Toyo Kisen Kaisha, urged by the general progress of the world's navigation and particularly in view of the approaching completion of the Panama Canal, has entered into negotiations with the Mitsubishi Dockyard for the construction of several ships of from 15,000 to 16,000 tons displacement. It is not decided yet whether the money required for their construction shall be raised by a loan or by making calls on its shares.

China Merchants S. N. Co.—The China Merchants Steam Navigation Company has demanded that the Government pay the company Tls. 500,000 for the passages of disbanded soldiers. Presidents Yuan intends to issue to the company domestic loan bonds to that amount.

Compania Cooperativa de Negros.—This company was recently organized with a capital of Pesos 200,000 for the purpose of improving transportation facilities between Negros and Iloilo. One steamer soon, and latter several others, will be placed on the run between Iloilo and the principal ports of Negros, and a first class passenger service maintained.

Nippon Yusen Kaisha.—The Nippon Yusen Kaisha has succeeded in purchasing from an English dockyard a steamer of ten thousand tons displacement, a sister ship to the one reported to have been recently purchased by the Company to arrive in Japan in May next. The new steamer is expected in Japan in October next.

The half-yearly meeting of the N. Y. K. was held at the Tokyo Chamber of Commerce on November 28, the President, Baron Kondo, presiding, Baron Kondo mentioned that the competition on the Calcutta run had caused freights to drop from yen 9 to yen 2.50 per ton. This competition was, of course, carried on at great loss, but it would be prosecuted until the object of the company was attained. One result of the competition was a greatly increased Japanese-Indian trade. As several of the company's steamers would cease to earn a subsidy very soon, eight new steamers were now under construction. The estimated expenditure on these was 15,000,000, which would be wholly disbursed by 1915. To meet this expenditure the company would not require to increase its capital or issue debentures.

The payment of a dividend at the rate of 10 per cent. per annum was approved, and the directors and other leading officials of the company were re-elected. It was decided to establish branches at Tokyo (near the harbour), Osaka, and Keelung. The proposal was finally approved to present the sum of yen 300,000 to the former directors of the company. Following is a statement of the account:

	Yen.
Brought forward	882,944.43
Gross Profit	2,803,067.87
Total	3,686,012.30

	Yen.
To Reserve	140,153.39
To make good deficiency in subsidy receivable from Government under Navigation Encouragement Law	258,579.91
Fund for increase of vessels and extension of service	1,300,000,00
Directors' fees	73,555.00
Dividend 10 per cent. per annum	1,100,000.00
Carried forward	813,723.99

Nisshin Kisen Kaisha.—This company at its general meeting declared a dividend of 7 per cent. The company has realised a fair amount of profit due to the conclusion of an agreement among various companies in the Hankow-Shanghai line, which had been exposed to competition.

PROPOSALS FOR CEMENT

OFFICE OF THE BUREAU OF SUPPLY,
MANILA, P. I., December 5th, 1912

Sealed proposals in triplicate will be received at this Office up to 11 a.m., January 20th, 1913, when they will be opened in the presence of the attending bidders for furnishing and delivering of 42,000 Barrels of Cement.

Proper forms and specifications may be had on application to this Office.

R. M. SHEARER,
Acting Purchasing Agent.

The Government of the Philippine Islands on November 29, 1912, issued the following as Executive Order No. 82.—Executive Order Numbered Seventy-five, current series, is hereby amended to read as follows:—

"It is hereby ordered that all Portland cement that may hereafter be purchased by the Government of the Philippine Islands for use in construction work to be done by or for the Government shall conform in every respect to the specification for Portland cement adopted by the departmental conference at the meeting held at the Bureau of Standards, Washington, District of Columbia, on February thirteenth, nineteen hundred and twelve, and approved by the heads of the several Departments, and promulgated by the President of the United States, and known as the United States Government specification for Portland cement: Provided, however, That sections twenty-four, twenty-nine, thirty and thirty-two shall be modified by the Purchasing Agent to meet the local conditions of the climate by reason of the fact that it will be necessary to make tests at a somewhat higher temperature than twenty-one degrees centigrade (seventy degrees Fahrenheit)."

NEWTON W. GILBERT,
Acting Governor-General.

The Department of Public Instruction, Bureau of Supply, Office of the Purchasing Agent, issued the following notification on December 2, 1912:—

By virtue of the authority contained in Executive Order No. 82, Series 1912, Sections 24, 29, 30 and 32 of the United States Government Specification for Portland Cement are hereby amended by substituting 27° C. (80.6° F) for the temperatures given in those Sections.

R. M. SHEARER,
Acting Purchasing Agent.

U. S. GOVERNMENT SPECIFICATION

The United States Government Specification for Portland Cement is as follows:—

I. SPECIFICATION

Definition.

1. The cement shall be the product obtained by finely pulverizing clinker produced by calcining to incipient fusion, an intimate mixture of properly proportioned argillaceous and calcareous substances, with only such additions subsequent to calcining as may be necessary to control certain properties. Such additions shall not exceed 3 per cent. by weight, of the calcined product.

Composition.

2. In the finished cement, the following limits shall not be exceeded:—

	Per cent.
Loss on ignition for 15 minutes	4
Insoluble residue	1
Sulphuric anhydride (SO_3)	1.75
Magnesia (MgO)	4

Specific Gravity.

3. The specific gravity of the cement shall be not less than 3.10. Should the cement as received fall below this requirement, a second test may be made upon a sample heated for 30 minutes at a very dull red heat.

Fineness.

4. Ninety-two per cent. of the cement, by weight, shall pass through the No. 100 sieve, and 75 per cent. shall pass through the No. 200 sieve.

Soundness.

5. Pats of neat cement prepared and treated as hereinafter prescribed shall remain firm and hard and show no sign of distortion, checking, cracking, or disintegrating. If the cement fails to meet the prescribed steaming test, the cement may be rejected or the steaming test repeated after seven or more days at the option of the engineer.

Time of Setting.

6. The cement shall not acquire its initial set in less than 45 minutes and must have acquired its final set within 10 hours.

Tensile Strength.

7. Briquettes made of neat cement, after being kept in moist air for 24 hours and the rest of the time in water, shall develop tensile strength per square inch as follows:—

	Pounds.
After 7 days	500
After 28 days	600

8. Briquettes made up of 1 part cement and 3 parts standard Ottawa sand, by weight, shall develop tensile strength per square inch as follows:

	Pounds.
After 7 days	200
After 28 days	275

9. The average of the tensile strengths developed at each age by the briquettes in any set made from one sample is to be considered the strength of the sample at that age, excluding any results that are manifestly faulty.

10. The average strength of the sand mortar briquettes at 28 days shall show an increase over the average strength at 7 days.

Brand.

11. Bids for furnishing cement or for doing work in which cement is to be used shall state the brand of cement proposed to be furnished and the mill at which made. The right is reserved to reject any cement which has not established itself as a highgrade Portland cement, and has not been made by the same mill for two years and given satisfaction is use for at least one year under climatic and other conditions at least equal in severity to those of the work proposed.

Packages.

12. The cement shall be delivered in sacks, barrels, or other suitable packages (to be specified by the engineer), and shall be dry and free from lumps. Each package shall be plainly labeled with the name of the brand and of the manufacturer.

13. A sack of cement shall contain 94 pounds net. A barrel shall contain 376 pounds net. Any package that is short weight or broken or that contains damaged cement may be rejected or accepted as a fractional package, at the option of the engineer.

Inspection.

14. The cement shall be tested in accordance with the standard methods hereinafter prescribed. In general the cement will be inspected and tested after delivery, but partial or complete inspection at the mill may be called for in the specifications or contract. Tests may be made to determine the chemical composition, specific gravity, fineness, soundness, time of setting and tensile strength, and a cement may be rejected in case it fails to meet any of the specified requirements. An agent of the contractor may be present at the making of the tests or they may be repeated in his presence.

15. In case of the failure of any of the tests, and if the contractor so desire, the engineer may, if he deem it to the interest of the United States, have any or all of the tests made or repeated by the Bureau of Standards, United States Department of Commerce and Labor, in the manner hereinafter specified, all expenses of such tests to be paid by the contractor. All such tests shall be made on samples furnished by the engineer.

STANDARD METHODS OF TESTING

Sampling

16. The selection of the samples for testing will be left to the engineer. The number of packages sampled and the quantity to be taken from each package will depend on the importance of the work, the number of tests to be made, and the facilities for making them.

17. The samples should be so taken as to represent fairly the material, and where conditions permit, at least 1 barrel in every 50 should be sampled. Before tests are made samples shall be passed through a sieve having 20 meshes per linear inch to remove foreign material. Samples shall be tested separately for physical qualities, but for chemical analysis mixed samples may be used. Every sample should be tested for soundness, but the number of tests for other qualities will be left to the discretion of the engineer.

Chemical Analysis.

18. The method to be followed for the analysis of cement shall be that proposed by the Committee on Uniformity in the Analysis of Materials for the Portland Cement Industry, reported in the Journal of the Society for Chemical Industry, volume 21, page 12, 1902, and published in Engineering News, volume 50, page 60, 1903, and in the Engineering Record, volume 48, page 49, 1903.

19. The insoluble residue shall be determined on a 1-gram sample which is digested on the steam bath in hydrochloric acid of approximately 1.035 specific gravity until the cement is dissolved. The residue is filtered, washed with hot water, and the filter-paper contents digested on the steam bath in a 5 per cent. solution of sodium carbonate. The residue is then filtered, washed with hot water, then with hot hydrochloric acid, approximately of 1.035 specific gravity, and finally with hot water, then ignited and weighed. The quantity so obtained is the insoluble residue.

Determination of Specific Grovity.

20. The determination of specific gravity may be made with a standardized apparatus of Le Chatelier or other equally accurate form. Benzine (62°. Baumé naphtha), or kerosene free from water, should be used in making the determination. The cement should be allowed to pass slowly into the liquid of the volumenometer, taking care that the powder does not adhere to the sides of the graduated tube above the liquid and that the funnel through which it is introduced does not touch the liquid. The temperature of the liquid in the flask should not vary more than 1°F during the operation. To this end the flask should be immersed in water. The results of repeated tests should agree with 0.01.

21. If the specific gravity of the cement as received is less than 3.10, a redetermination may be made as follows:

Seventy grams of the cement is placed in a nickel or platinum crucible about 2 inches in diameter and heated for 30 minutes at a temperature between 419°C and 630°C. After the cement has cooled to atmospheric temperature the specific gravity shall be determined in the same manner as described above. The cement should be heated in a muffle or other suitable furnace, the temperaturs of which is to be maintained above the melting point of zinc (419°C) but below the melting point of antimony (620°C.). This maximum temperature can be recognized as a very dull red which is just discernible in the dark.

Determination of Fineness.

22. The No. 100 and No. 200 sieves shall conform to the standard sieve specifications of the Bureau of Standards, Department of Commerce and Labor.

23. The determination of fineness should be made on a 50-gram sample, which may be dried at a temperature of 100°C (212°F) prior to sifting. The coarsely screened sample should be weighed and placed on the No. 200 sieve, which, with the pan and cover attached should be held in one hand in a slightly inclined position and moved forward and backward in the plane of inclination, at the same time striking the side gently about 200 times per minute against the palm of the other hand on the upstroke. The operation is to be continuep until not more than 0.05 gram will pass through in one minute. The residue should be weighed, then placed on the No. 100 sieve, and the operation repeated. The sieves should be thoroughly dry and clean. Determination of fineness may be made by washing the cement through the sieve or by a mechanical sifting device which has been previously standardized with the results obtained by hand sifting on equivalent samples. In case of the failure of the cement to pass the fineness requirements by the washing method or the mechanical device, it shall be tested by hand.

Mixing Cement Pastes and Mortars.

24. The quantity of cement or cement and sand to be used in the paste or mortar should be expressed in grams and the quantity of water in cubic centimeters. The material should be weighed, placed upon a nonabsorbent surface, thoroughly mixed dry if sand be used, and a crater formed in the center, into which the proper percentage of clean water should be poured; the material on the outer edge should be turned into the crater by the aid of a trowel. As soon as the water has been absorbed, the operation should be completed by vigorously mixing with the hands for one minute and a half. During the operation of mixing, the hands should be protected by rubber gloves. The temperature of the room and the mixing water should be maintained as nearly as practicable at 27°C (80.6° F).

Determination of Normal Consistency.

25. The normal consistency for neat paste to be used in making briquettes and pats should be determined by the ball method, as follows:

26. A quantity of cement paste should be mixed in the manner above described under Mixing Cement Pastes and Mortars, and quickly formed into a ball above 2 inches in diameter. The ball should then be dropped upon a hard, smooth, and flat surface from a height of 2 feet. The paste is of normal consistency when the ball does not crack and does not flatten more than one-half of its original diameter.

27. Trial pastes should be made with varying percentages of water until the correct consistency is obtained.

28. The percentage of water to be used in mixing mortars for sand briquettes is given by the formula:

$$y = 2/3 \frac{P}{n + 1} + K$$

in which "Y" is the percentage of water required for the sand mortar, "P" is the percentage of water required for neat cement paste of normal consistency, "n" is the number of parts of sand to one of cement by weight, and "K" is a constant which for standard Ottawa sand has the value 6.5.

The percentage of water to be used for mortars containing 3 parts standard Ottawa sand, by weight, to 1 of cement is indicated in the following statement:

Percentage of water for neat cement paste	Percentage of water for 1 to 3 mortars of standard Ottawa sand
18	9.5
19	9.7
20	9.8
21	10.0
22	10.2
23	10.3
24	10.5
25	10.7
26	10.8
27	11.0
28	11.2
29	11.3

Determination of Soundness.

29. Pats of neat cement paste of normal consistency about 3 inches in diameter, one-half inch in thickness at the center, and tapering to a thin edge, should be kept in moist air for a period of 24 hours. One pat should then be kept in air and a second in water, at the ordinary temperature of the laboratory not to vary greatly from 27° C (80.6° F), and both observed at intervals for at least 28 days. A third pat should be exposed to steam at atmospheric pressure above boiling water for 5 hours.

Determination of Time of Setting

30. The time of setting should be determined by the standardized Gillmore needles, as follows: A pat of neat cement paste about 3 inches in diameter and one-half inch in thickness with flat top, mixed at normal consistency should be kept in moist air, at a temperature maintained as nearly as practicable at 27° C (80.6° F). The cement is considered to have acquired its initial set when the pat will bear, without appreciable indentation, a needle one-twelfth of an inch in diameter loaded to weigh one-fourth of a pound. The final set has been acquired when the pat will bear without appreciable indentation, a needle one twenty-fourth of an inch in diameter, loaded to weigh 1 pound. In making the test the needle should be held in a vertical position and applied lightly to the surface of the pat. The pats made for the soundness test may be used to determine the time of setting.

Tensile Tests.

31. Tensile tests should be made on an approved machine. The test pieces shall be briquettes of the form recommended by the Committee on Uniform Tests of Cement of the American Society of Civil Engineers, and illustrated in Circular 33 of the Bureau of Standards. The briquettes shall be made of paste or mortar of normal consistency. Immediately after mixing, the paste or mortar should be placed in the molds, pressed in firmly by the fingers and smoothed off with a trowel without mechanical ramming. The material should be heaped above the mold, and in smoothing off, the trowel should be drawn over the mold in such a manner as to exert a moderate pressure on the material. The molds should be turned over and the operation of heaping and smoothing off repeated. Not less than three briquettes should be made and tested for each sample for each period of test. The neat tests are not considered so important as the sand tests. The briquettes should be broken as soon as they are removed from the water. The load should be applied at the rate of 600 pounds per minute.

Storage of Test Pieces.

32. During the first 24 hours after molding the test pieces should be kept in air sufficiently moist to prevent them from drying. After 24 hours in moist air the test pieces should be immersed in water. The air and water should be maintained as nearly as practicable at 27°C (80.6° F).

Standard Sand.

33. The sand to be used shall be natural sand from Ottawa, Ill., screened to pass a No. 20 sieve and retained on a No. 30 sieve.

34. Sand having passed the No. 20 sieve shall be considered standard when not more than 2 grams pass the No. 30 sieve after one minute continuous sifting of a 200-gram sample.

35. The No. 20 and No. 30 sieves shall conform to the Standard sieve specifications of the Bureau of Standards, Department of Commerce and Labor.

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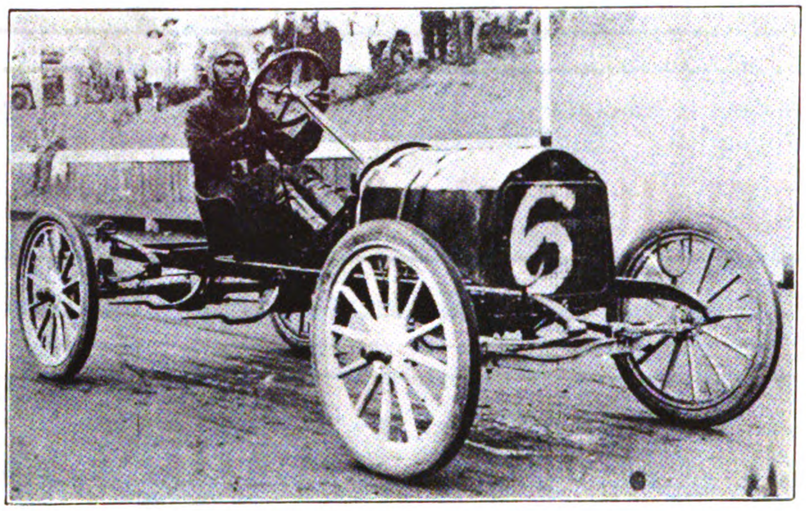

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THE FAR EASTERN REVIEW

Engineering
Finance ❀ Commerce

遠東時報

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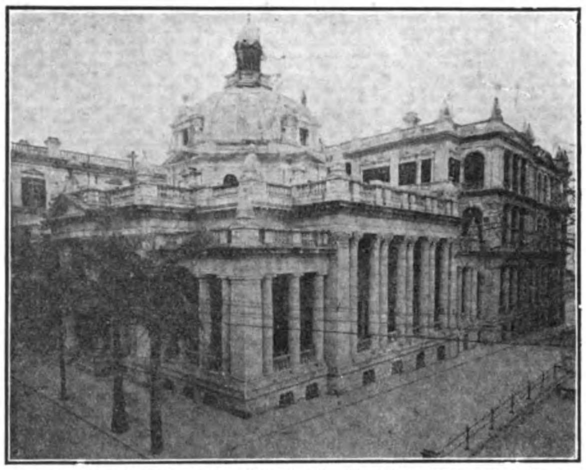

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, JANUARY, 1913 No. 8

THE TIENTSIN-PUKOW RAILWAY

A Detailed Historical and Descriptive Account

The railway system of China has been materially augmented by a valuable trunk line 621 miles in length connecting Tientsin and Pukow. It effects connection between Shanghai, the emporium on the coast, near the mouth of the Yangtsze River, and Peking, the capital of China. What is more important it establishes effective and rapid communication between the middle maritime provinces of China and those of the north, and opens the way of overland travel from the China littoral to Europe, via the trans-Siberian railway. Shanghai is already placed within 36 hours of Peking, as against the previous nearest route of from three to six days. In the near future, with the introduction of more efficient rolling stock and the betterment of traffic organisation, that time will be materially reduced. Under existing conditions a passenger may leave Shanghai at 11 p.m. on Sunday or Thursday, and dine in Peking on Tuesday or Saturday. If he so desires, he may, at Tientsin or Peking, board the express train leaving for Europe on the latter two nights, having no sea to cross on the journey.

The route is destined to become one of the most popular in China. Certainly for communication between Peking and the seaboard it will eclipse all others. As an earning factor it should early demonstrate its unique advantages. At the same time it should be the means of bringing increasing profit to that already prosperous system known as the Chinese Northern railways, and particularly will it feed the chief portion thereof—the Tientsin-Mukden Section—which route must be used to reach Europe from the north. The southern portion of this now practically completed service was opened between Shanghai and Nanking (a distance of 200 miles) in 1908. At Nanking the Yangtsze River has to be crossed by ferry—which system it may never prove profitable to change by bridging owing to the character of the river bottom and the width and volume of the water, though the future may see a train ferry in operation.

The desirability of filling the gap between the existing southern and northern system by connecting Tientsin with Pukow, a town on the northern bank of the Yangtsze River, opposite Nanking, was the subject of discussion for many years. The idea entered the realms of practical effort in 1908. An agreement was then signed according the right of construction to a German and British syndicate on a loan guaranteed by the Chinese Government, and placing the operation of the road after completion in the hand of the Chinese Government, as represented by the Board of Posts and Communications.

THE LOAN AGREEMENT

The line was divided into two sections. The northern portion from Tientsin extended to the Grand Canal, a distance of 385 miles, and was built by German capital. The southern portion, extended from the Grand Canal to Pukow, some 236½ miles, and was built by British capital. The combination of interests in this line may be briefly explained by reference to the early efforts to persuade the Central Government to undertake the enterprise.

On March 6, 1898, an agreement was signed between China and Germany granting the latter

YI KUNG-CHO

DIRECTOR-GENERAL OF RAILWAYS, CHINA

certain railway construction rights, one clause reading as follows:

> "The Chinese Government sanctions the construction by Germany of two lines of railway in Shantung. The first will run from Kiaochow and Tsinanfu to the boundary of Shantung Province, via Wei-hsien, Tsinchow, Pashan, Tsechuen, and Suiping. The second line will connect Kiaochow with Chinchow, whence an extension will be constructed to Tsinanfu through Laiwuhsien."

This agreement forms the basis of Germany's rights to participation in the Tientsin-Pukow line. The extension in the clause quoted above referred to a line running north and south across Western Shantung. Prior to the signing of this agreement, however, the Chinese Government had granted to a Chinese, Yung Wing, the right to build a line connecting Tientsin with the Yangtsze, by way of Shantung, and on August 23, 1898, a contract was signed for that purpose by a Anglo-American syndicate, for a sum of £5,500,000. A German syndicate in June, 1898, proposed to the Chinese Government to float a loan of £4,500,000 at 5½ per cent., issued at 92 to the Government and reimbursable in 35 years. This offer was refused, but the clash of claims brought about a deadlock which was only solved by an agreement to combine interests. On September 1 and 2, 1898, representatives of the British and Chinese Corporation and the Hongkong and Shanghai Bank conferred with representatives of the German syndicate, and as a result an agreement was evolved as follows:

> "The line from Tientsin and Tsinanfu, or to another point on the northern frontier of the province of Shantung, and the line from the southern point of the province of Shantung to Chinkiang, to be constructed by the Anglo-German Syndicate (meaning the German Syndicate of the one part and the Hongkong and Shanghai Banking Corporation and the British and Chinese Corporation, Limited, on the other part), in the following manner, viz:—
>
> "1.—The capital for both lines to be raised jointly.
>
> "2.—The line from Tientsin to Tsinanfu, or to another point on the northern frontier of the province of Shantung, to be built and equipped and worked by the German group.
>
> "3.—The lines from the southern point of the province of Shantung to Chinkiang to be built and equipped and worked by the English group.
>
> "4.—On completion the line to be worked for joint account."

In addition to a working arrangement with regard to this particular line the parties also defined their spheres of activity in railway enterprise, the Germans restricting themselves to the Yellow River valley and the British to the Yangtsze, a disposal of interests which later gave excuse for much criticism of the British representatives who agreed to the proposals.

Consequent upon this solution of mutual claims the Anglo-German group entered into negotiations with the Chinese Government. On May 10, 1899, a preliminary loan agreement was signed, though progress was ultimately obstructed by the outbreak of the Boxer trouble. Negotiations were not resumed until June, 1902, and the final agreement was not signed until January 13, 1908. That agreement sanctioned the flotation of a loan of £5,000,000 at 5%, issued to the Chinese at 93 and the public at 98¾, for a term of 30 years, repayment to commence at the end of 10 years. The security was a certain portion of the likin and internal revenues of Chihli and Shantung and certain revenues in

Kiangsu. Regarding the administration of the line, Article 17 of the agreement provided that:

> "The construction and control of the railway will be entirely in the hands of the Imperial Chinese Government. For the work of the northern and southern sections respectively the Chinese Government will select and appoint fully qualified German and British Chief Engineers, acceptable to the Syndicate. These two Chief Engineers, shall be under the orders of the Managing-Director, or his duly authorised representative, and will carry out all the wishes of the administration with regards to the plan and construction of the line. They must pay all due respect to the Director-General and the Managing-Director. The terms of their respective agreements will be arranged by the Director-General on his sole authority."

The agreement limited the use to which the loan monies might be put by stating (Article 3) that:

> "The capital will be used for the construction of the line, the purchase of the land and rolling stock, and to meet the current working expenses of the line when in operation, also the payment of the interest on the loan while the line is being constructed."

To avoid peculation, Article 14 provided that:

> "during the period of construction the accounts will be open at any time to an inspector appointed and paid by the Syndicate."

To ensure Chinese control after completion Article 17 stated:

> "On the completion of the line the Imperial Chinese Government will administer both sections as one undivided Government railway and will appoint an Engineer-in-chief, who, during the period of the loan shall be a European, without reference to the Syndicate."

These terms were distinctly favorable to China, and the precedent set has been seized upon and will be used to obtain better terms in future agreements The Board of Posts and Communications are convinced that the management of roads should be in the hands of the Government. And in the hands of Government they should be exceedingly profitable, though everything depends not only upon sagacious management, but upon scrupulous treatment of earnings. The European bankers' sole and only object in endeavoring in the past to obtain supervision over railway management and finance were to see to it that all monies were honestly dealt with and the interests of bondholders protected. The opponents of what are now described as "the Tientsin-Pukow terms" declare that the way has been deliberately left open for ruthless squandering and peculation of railway funds. It is therefore, all the more incumbent upon the railway administration to demonstrate to the world that they are capable of controlling their officials and the funds that are destined to pass through their' hands. If the Board of Posts and Communications can do this they will justify what caustic critics, in their mildest moments, characterise as "the British Legation's optimistic faith in Young China." They will at the same time, give the lie to the statement that "there was nothing, either in the necessities of the situation or in recent experience, to justify recognition of the provinces' claims to handle foreign capital without restriction or supervision." Likewise they will refute the statement that "British diplomacy in agreeing to these new terms, consented to arrangements which were morally certain to weaken the Central Government's credit abroad and its authority at home." The officials of China are distinctly on their trial.

Originally the loan above mentioned was to have been for £7,500,000, but ultimate discussion reduced it to £5,000,000 to be issued in two instalments. The first was, as has been mentioned, placed on the market in March 1908, at 98¾, the price to the Chinese Government being 93% of the face value (£100). On future instalments the Chinese Government was to receive the same rate as paid by the public less 5½ points commission to the financial syndicates.

The second instalment was floated in June, 1909, and was for £2,000,000 at 5 per cent., issued at par. Both issues were over-subscribed. This oversubscription at once gave evidence of the popularity of these investments. One feature was the considerable portion subscribed for by Chinese in Peking and Tientsin, three of the Metropolitan Boards securing £260,000 in bonds, exclusive of those purchased by private Chinese investors.

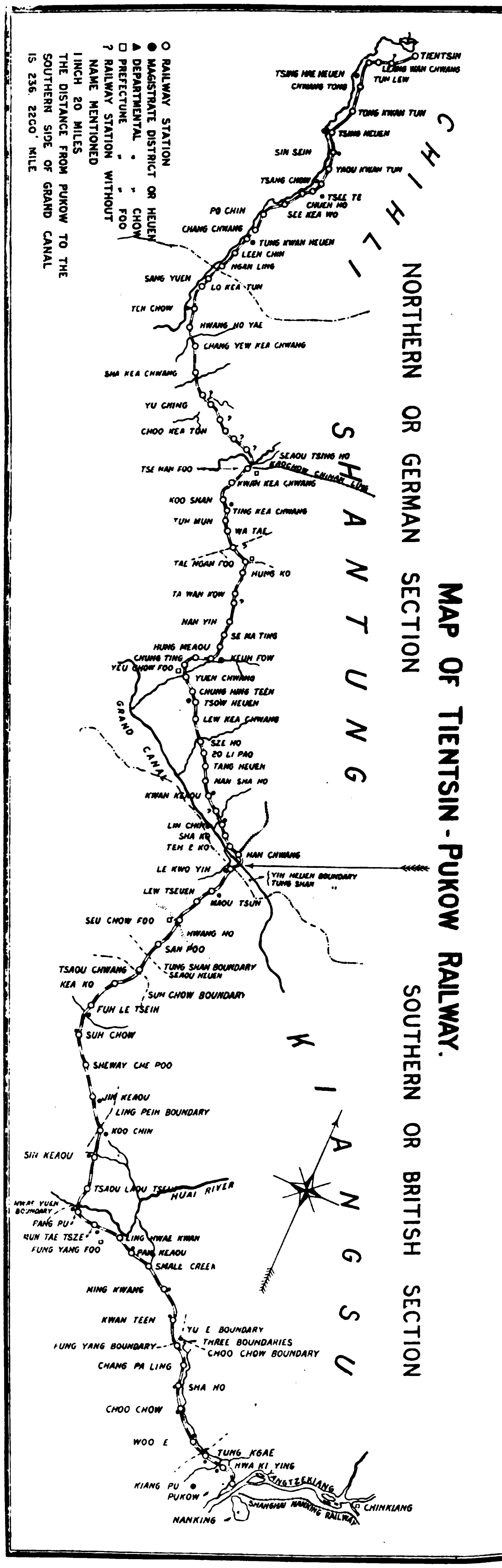
By 1910 the amounts so raised were exhausted, and it became necessary to raise a supplementary loan to complete the work. A new agreement was entered into for a loan of £4,800,000 at 5 per cent., and the instalment of £3,000,000 was offered to the public, £1,110,000 in London and £1,890,000 in Germany. This loan was submitted to the public at 100½ per cent. Despite its issue at a premium it was so heavily oversubscribed on the day of issue that the subscription lists were closed in London 50 minutes after opening. The quotation was then at ¾ premium, though it eased a little afterwards, and closed at ½ premium. The balance of the bonds (£1,800,000) is still outstanding, though private advances of £500,000 for the German section and £400,000 for the British, have been made.

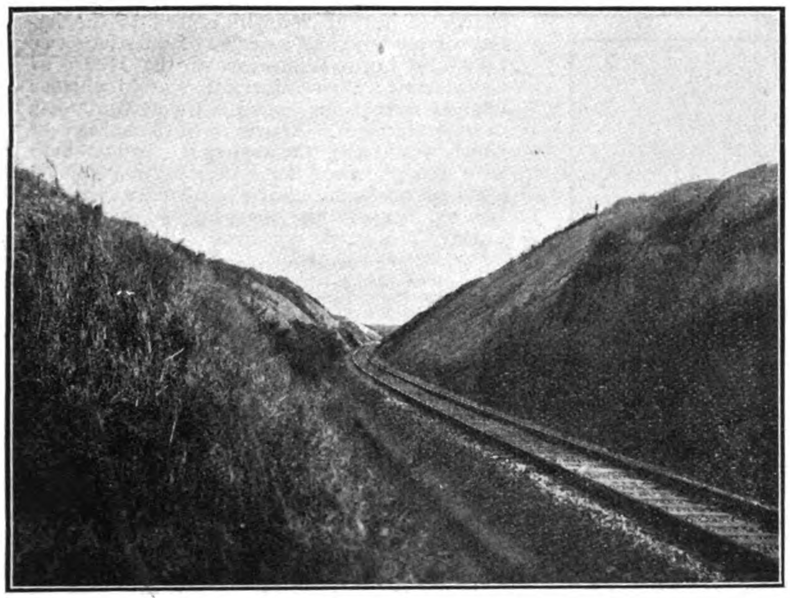
It is of interest to recall that in the final negotiations Liang Tun-yen represented the Chinese Government, and Mr. J. O. P. Bland the Chinese Central Railways Company, Ltd., (the substitute of the British and China Corporation which conducted the opening negotiations) and M. Cordes, the Deutsch-Asiatische Bank. The Chinese Central Railways Company, Ltd., was formed in January, 1904, with a capital of £101,000.

Inauguration of Operations.

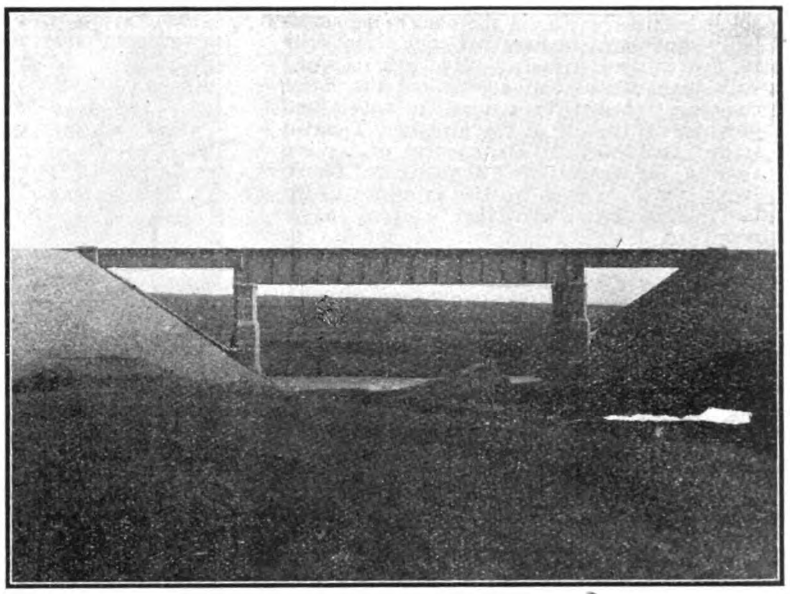
The successful flotation of the first loan did not mean a simultaneous commencement of construction work on both sections. The official inauguration of operations in the north took place on June 30, 1908, when the Chihli Viceroy with much ceremony, turned the first sod at Hsi-ku, a suburb of Tientsin. Work commenced in August. On the southern section the turning of the sod did not take place until October of the same year, and work was not begun until January, 1909, by which time the northern operations were in full swing. Lu Hai-huan was appointed the Director-General of the whole line, and under him were Li Te-Shun as Managing-Director of the Northern Section, and K. S. Low in a similar capacity in the south.

The early operations in the north were unhappily marred by a scandal which involved primarily the Managing-Director, Li Te-shun, and secondarily the Director-General and others. The Director-General is supposed to have suffered



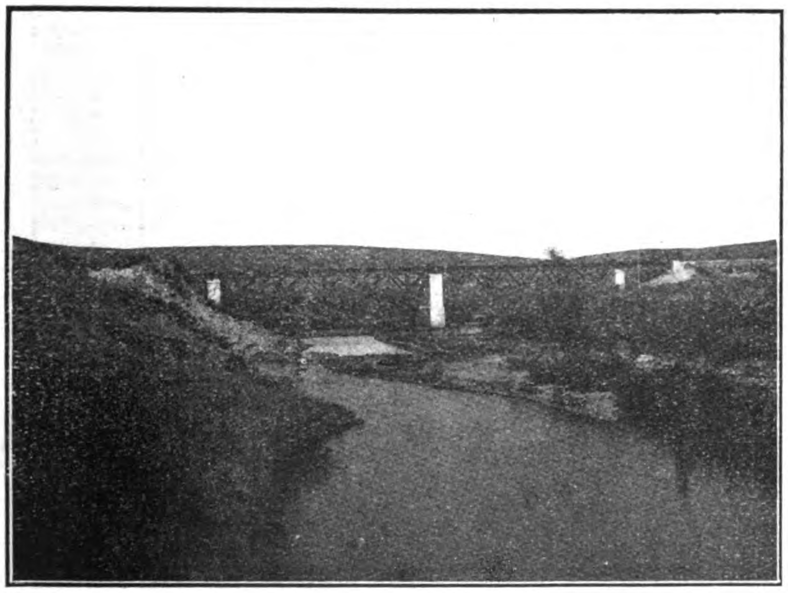


TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. ROCK CUTTING AT SANCHIEH

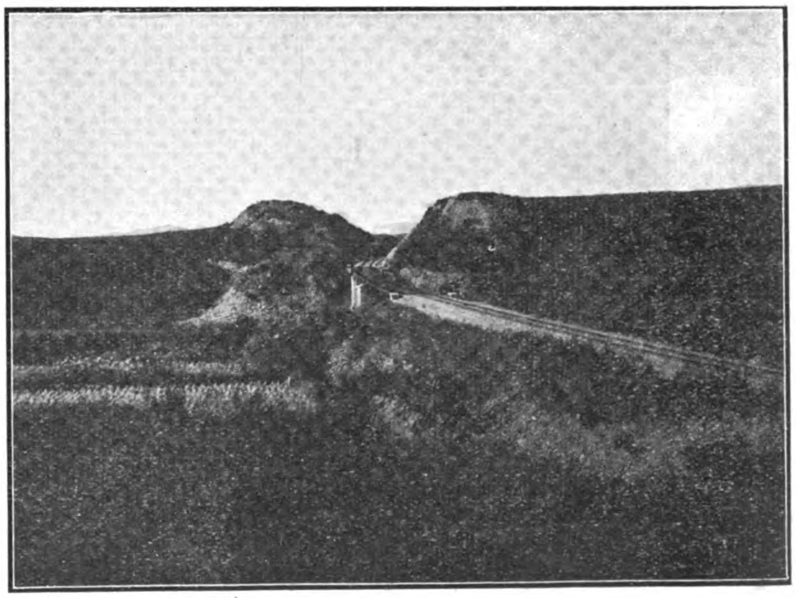


TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. BRIDGE WITH STONE PIERS

TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. HSUCHOWFU STATION



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. ONE OF THE BRIDGES



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. CUTTING AND CURVE

solely because he was in the post of responsibility and not because of any complicity in the alleged frauds. He was charged with malpractices and corruption, the latter comprising bribes in connection with land purchases at the site of the proposed Tientsin station, coal contracts, employment of coolies, etc., to the extent of Tls 3,500,000. Public feeling was excited by the exposure of Li by leading men who had suffered as a result of land speculation. Li appears to have undertaken that the Tientsin terminus of the railway should be at a certain point, and, in accordance with a promise to that effect, certain merchants launched into large land deals in the locality Li was involved either in speculation or peculation, or both, and Nemesis came upon him when the Viceroy of Chihli decided to place the terminus somewhere else other than in the place arranged by Li. The result was the loosing of a veritable Bedlam. Impeachments were lodged in Peking, and, as a result, an Imperial Edict was issued cashiering the Director-General, Lu Hai-huan, and the Managing-Director Li, the edict forbidding the latter to re-enter the Imperial service. Several others connected with the scandal were likewise deprived of rank, one being exiled and another being deported to his native town to be placed under surveillance.

Hsu Shih-chang, then President of the Railway Board, was authorised by the Regent to take up the duties of Director-General and he signalised his entrance to office by personally being responsible for all disbursements, an order from him prohibiting either of the Managing-Directors from paying out funds exceeding $500 without special sanction.

The trouble connected with the location of the station was settled by establishing it at the existing stopping place on the line to Peking, formerly called the "Tientsin City Station." A new station was also established on the right bank of the river and called "Tientsin West." The former "city" station was called "Tientsin Central," while the old station of the Peking-Mukden line in the Russian concession, formerly named "Tientsin Settlement" station, was renamed "Tientsin East." It is now the terminal of all trains from Pukow.

Another matter which at one time called for strong comment in British papers was a charge of irregularity with regard to the letting of tenders, and a series of questions was asked by Lord Winterton in the House of Commons to elicit information as to whether tenders were being called in the best interests of manufactures. Article 18 of the agreement which deals with the matter is reprinted here as a record, since the FAR EASTERN REVIEW has made particular efforts to obtain a fair field for suppliers in the awarding of tenders in China. The article says:

"For the Northern and Southern Sections of the Railway, respectively the Deutsch-Asiatische Bank and the Chinese Central Railways Limited will act as agents of the Railway Administration during construction for the purchase of all materials, plant and goods required to be imported from abroad For all important purchases of such materials tenders shall be called for by the Managing-Director; in the case of all tenders, indents and orders for the importation of goods, and materials from abroad the said agents shall purchase the materials required on the railway and shall charge the original net cost of the same plus a commission of five (5) per cent. It is understood that no orders for materials shall be executed or any expenditure incurred without due authorisation by the Managing-Director.

"In return for payment of commission as above stated, the Deutsch-Asiatische Bank and the Chinese Central Railways Limited as agents, within their respective sections, shall be prepared to superintend the purchase of all foreign materials required for the construction and equipment of the railway, which shall be purchased in the open market at the lowest rate obtainable, it being understood that all such materials shall be of good and satisfactory quality, and that the railway administration shall have the right to reject on arrival in China materials which do not come up to specifications. At equal rates and qualities goods of German and British manufacture shall be given preference over other goods of foreign origin for the Northern and Southern sections respectively. The railway administration reserves the right, while paying the above stipulated commission to the said agents in respect of the purchases of foreign materials, to avail itself of the services of other agents in China or abroad should it see fit to do so.

"Original invoices and inspectors' certificates are to be submitted to the Managing-Director; and all purchases made by the agents on behalf of the Railway shall be supported by manufacturers' original invoices and inspectors' certificates.

"No commission shall be paid to the agents except as above provided; but it is understood that the railway administration shall provide out of railway funds for the remuneration of consulting engineers whenever their services are engaged.

"With a view to encouragement of Chinese industries, preference will be given at equal

CHOU TZE-CHI

TUTU OF SHANTUNG WHO DROVE THE LAST SPIKE OF THE YELLOW RIVER BRIDGE

TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. MR. T. W. T. TUCKEY, M. INST. C. E., ENGINEER-IN-CHIEF, AND OFFICE STAFF.

prices and qualities, over British, German or other foreign goods to Chinese materials and goods manufactured in China. No commission will be paid on purchase of such materials and goods.

"It is understood and agreed that after the construction of the line is completed the Deutsch-Asiatische Bank and the Chinese Central Railway Limited, within their respective sections, will be given the preference for such business, during the currency of the Loan, for the supply of foreign materials as the railway administration may require, on terms to be hereafter mutually agreed upon."

Route of the Line

The route of the line runs to a greater or less extent parallel with the Peking-Hankow Railway which connects the capital with the Yangtsze some 200 miles to the west. For its entire length the line also practically parallels that famous monument to Chinese ancient enterprise, the Grand Canal, and in Shantung the traveller may at many spots see the tops of junk sails on the waterway above the distant trees. The crossing of the canal is practically the junction of the northern and southern sections. Between Tientsin and the Yellow River the country is a vast level plain of alluvium mingled with loess, and without grades. It is intensely cultivated, but the soil grows less productive as the Yellow River region is reached.

After crossing the river (over the splendid bridge illustrated and described in detail in the October number of the Far Eastern Review) and passing Tsinan-fu the capital of Shantung, hilly country is reached, the formation being a mingling of gneiss, granite, sandstone, and limestone, and a few hours out the historic Sacred Mountain, Tai-shan, is passed, the line skirting its base. The rugged peak rises 5,060 feet directly from the plain, and is the most noted of the five sacred mountains of China. It was a famous pilgrim resort twenty centuries before the Christian era. As tradition records, the ancient monarch Shun (one of the first Emperors of China, who reigned B.C. 2255 to 2205) is said to have sacrificed there. At the present day each sect has erected temples and monasteries on its peaks, and thousands of pilgrims throng to them in spring time. Likewise Europeans have taken advantage of its salubrious heights and in the summer months escape the heat by residing in the various houses built in the groves.

Skirting hills and crossing wide cultivated plains the sub-prefecture or district city of Kufeu-hsien is passed. This is the birth place of Confucius. The great sage was born there 551 B.C. and died in 479, his tomb, also the resort of great numbers of pilgrims, being reached by leaving the train at Chu-fu, a few miles to the north of Yen-chow-fu.

Great plains are traversed almost to the Yangtsze, but as the southern section of the line passes out of Shantung the soil becomes poorer, though grain in large quantities is grown, and further south towards Pukow sesame seed is produced in large quantities, and the region is likely to prove a rich bean producing one when that crop is properly introduced.

Towards the south of Shantung the line for some distance skirts the Weishan lake, a large sheet of shallow water, connected with the Grand Canal, which is soon afterwards crossed. Rocky country is here entered, the elevation being some 300 feet above the level of Nanking, and the line dips to the great plain which practically continues for the next 135 miles to Pukow, passing through the flood and famine region of the Hwai River valley and the Shai Ho valley. Shortly after crossing the Grand Canal, Hsuchowfu is reached, and this point is of interest as it is in the old bed of the Yellow River. The old embankments still stand.

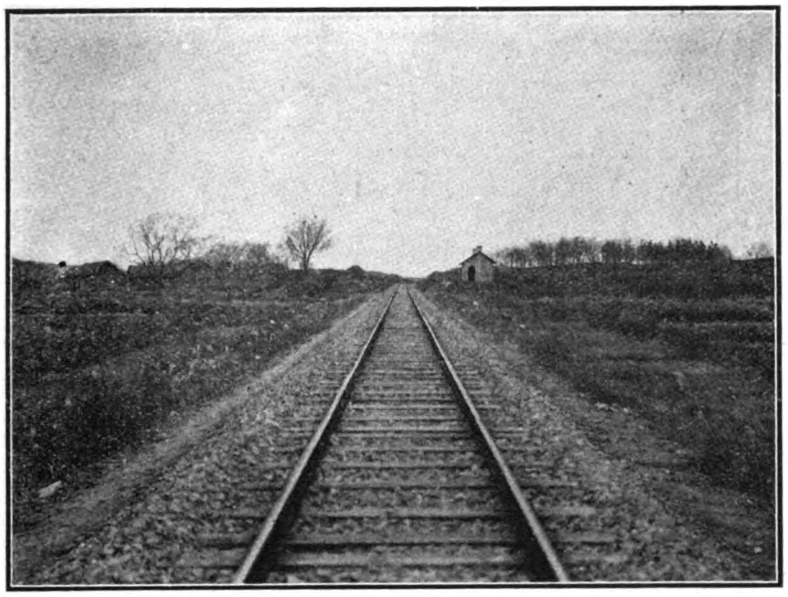
The southern section furnished grave problems for the engineer in embankment work and the prevention of damage from flood, which were solved with credit, the provisions against floods or the breaking of river dykes, notably the Hwai River banks, being excellent.

Taking it all through, the country developed by the line is rich agriculturally, grain being raised on the lowlands and fruit on the highlands. Coal and iron deposits exist in certain localities and there are indications of the presence of lead and other metals. Building stone for building and other commercial purposes is also plentiful, and especially in portions of Shantung not far from Tsinan-fu there is a large industry in the production of mill-stones for the crushing of grain. These have been exported for hundreds of years to different parts of the country, by various means, some finding their way to the southern provinces by the Grand Canal. Brick-making also shows promise of development.

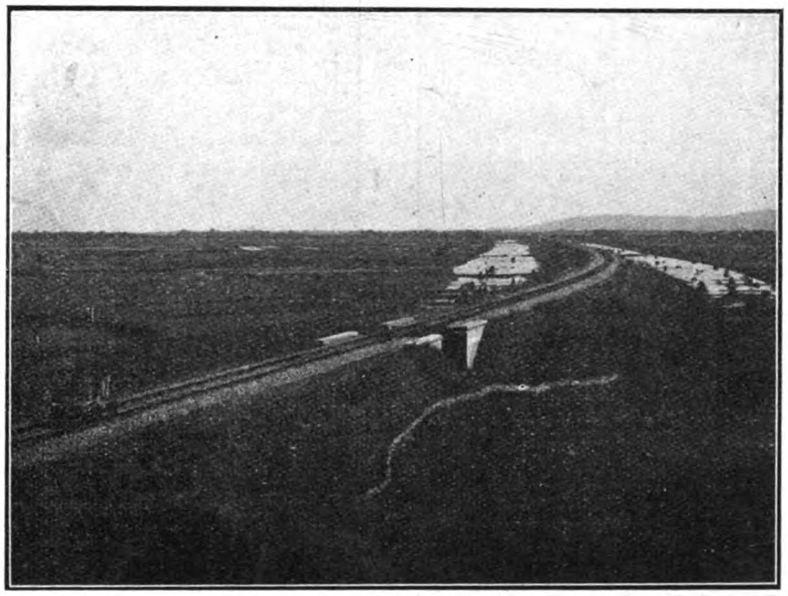
The fact that the line runs between the two large rivers, the Yangtsze and the Yellow, gives it great prospects and the possibilities to the westward are sufficient to give it considerable importance. Its prospects as an earner are exhibited by the figures for November last, which showed a return of $524,678, which may be taken as a fair average. The total for the year would be $6,296,136, which is remarkable when it is remembered that only two through trains run each way at present each week, while the ordinary daily service is hardly more than of a construction train nature, no effort being made yet to attract passengers or freight.

Methods of Construction

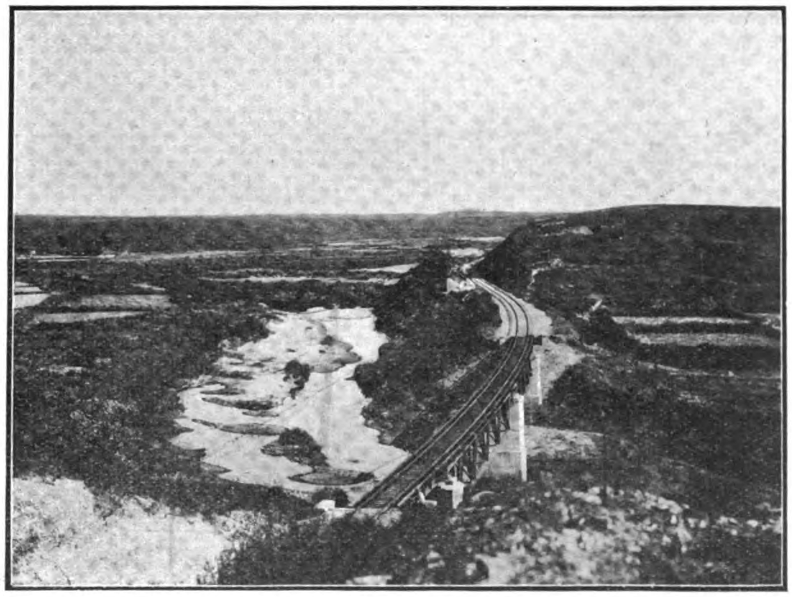
As is the case with all railways in China coolie labor was used throughout the construction, with very few mechanical aids. The low prices obtainable make it very difficult for machinery to compete, especially in view of the high cost of coal. The contract system, dealing with native contractors, has also been found to give satisfaction in the manner of performance of the work. The bulk of the labor is employed locally from the farming class, but, on this



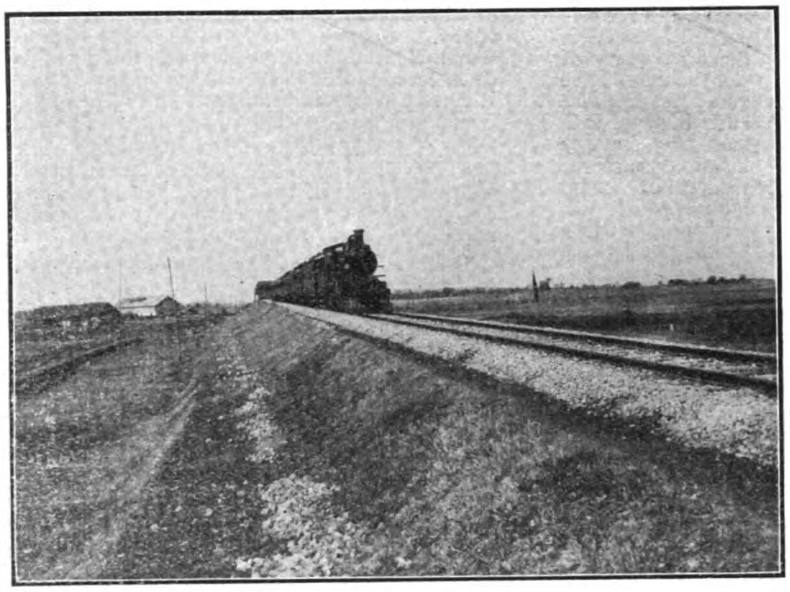
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
A PLATE-LAYER'S HOUSE



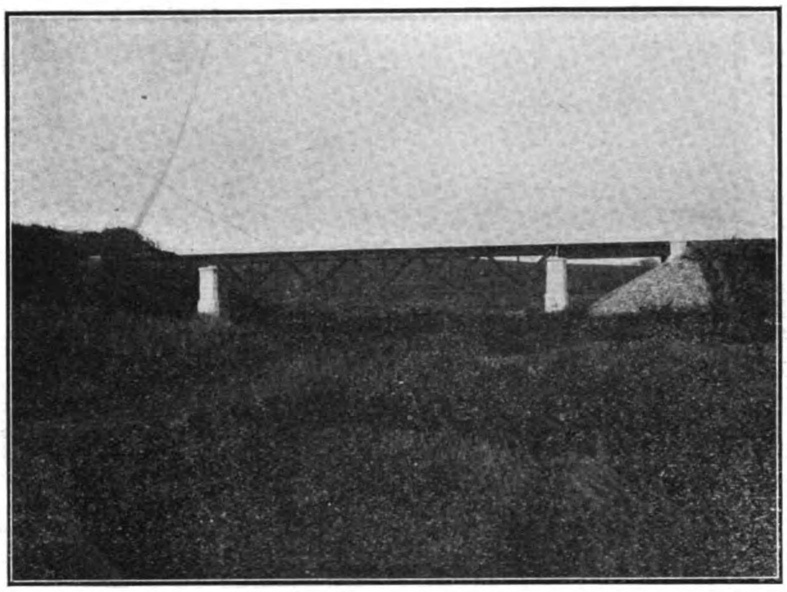
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TUNG KE SWAMP, THE WORST TROUBLE ON THE LINE



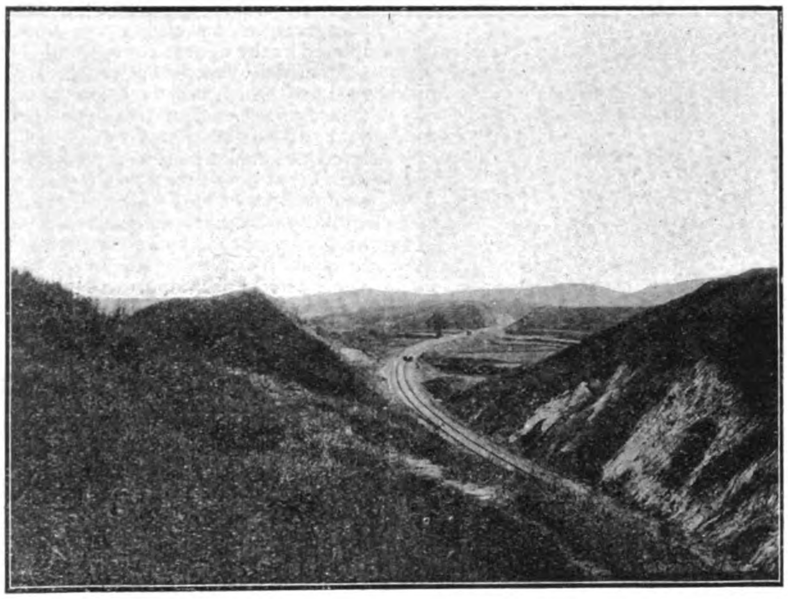
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
VIEW AT MILE 51



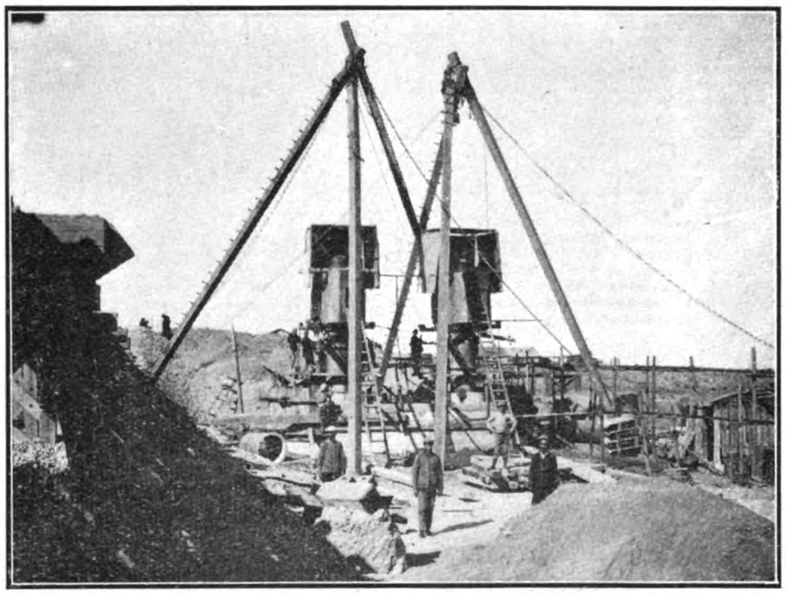
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TRAIN AT PENG-PU



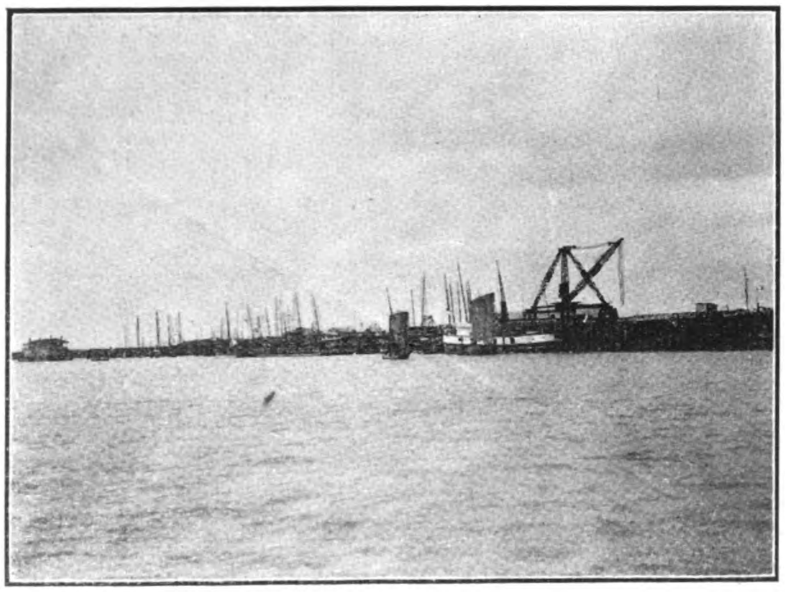
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
BRIDGE WITH CONCRETE PIERS



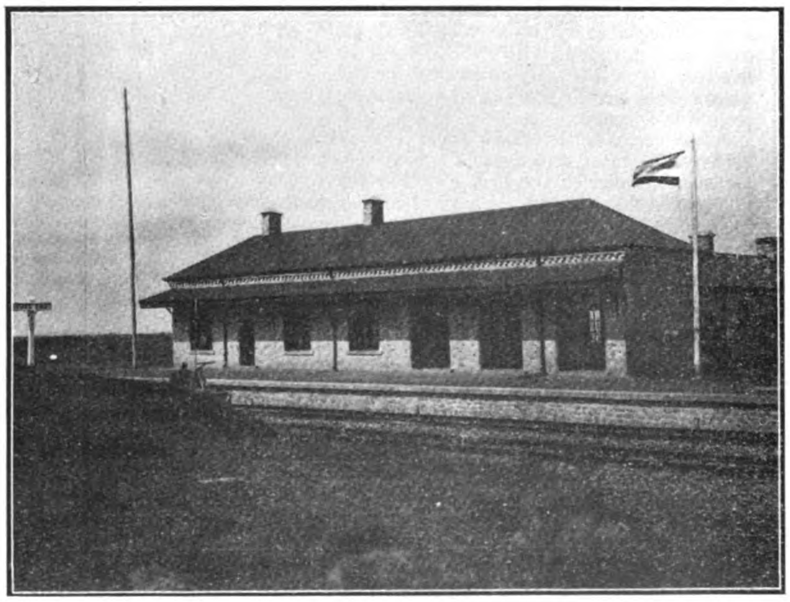
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
VIEW NEAR PUKOW



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
SINKING A BRIDGE PIER BY COMPRESSED AIR



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TERMINUS ON THE YANGTSZE



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
A THIRD CLASS STATION

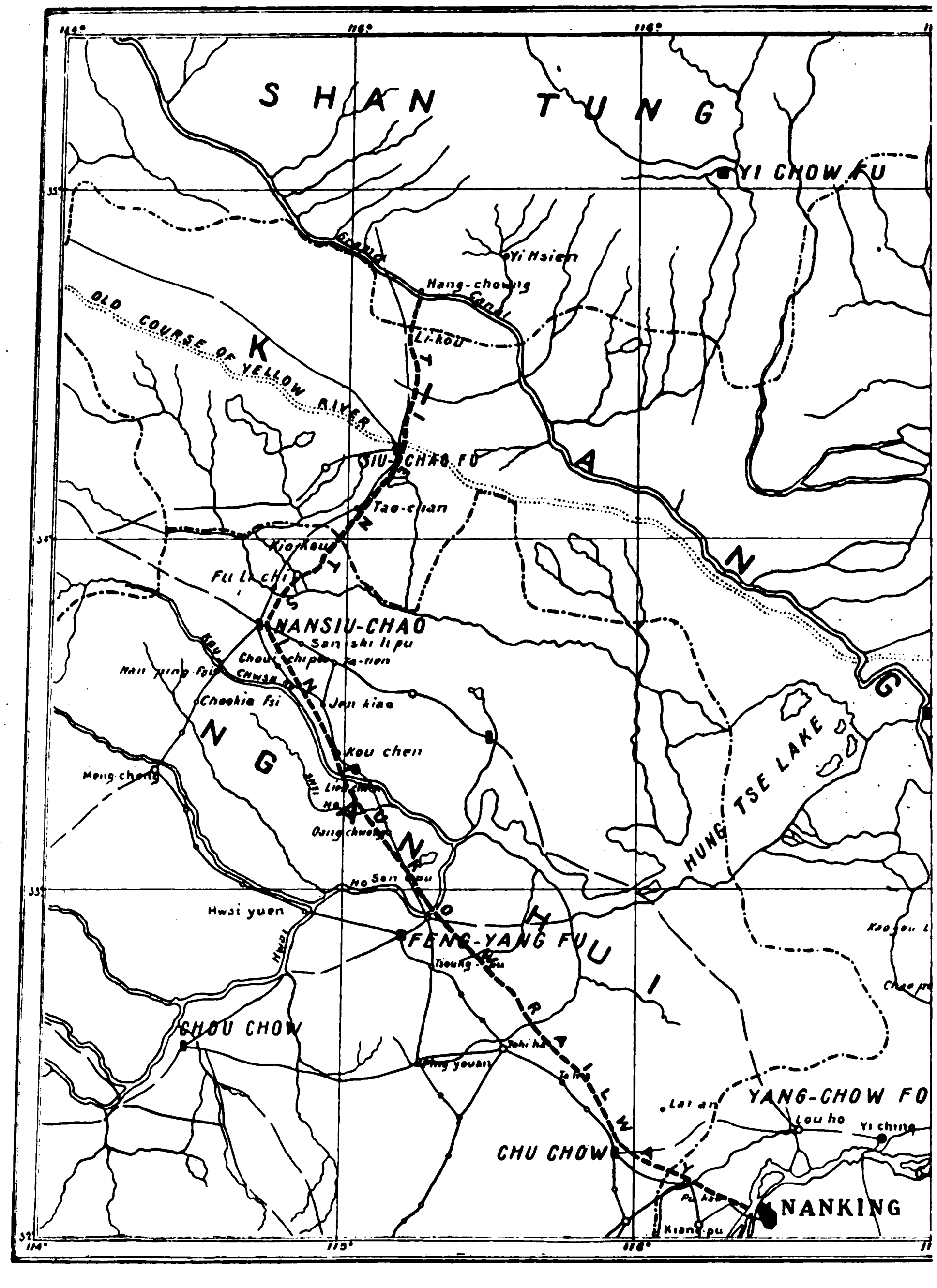
line a number of experienced workmen who had assisted in building the earlier roads in the north, were available as construction foremen.

Grading and concrete work were conducted with the ordinary coolie methods of manual handling and mixing, and transporting in baskets. Carpenter work on forms was done by Chinese carpenters, the timber being mostly imported from Oregon and delivered at the working site in large sticks, such as 12 X 12 inch pieces, and then sawed up into boards by hand. This was for convenience in shipping and added security against theft of lumber. Scaffolding, bracing, and false-work were in many cases made of cross-ties piled crib-fashion. Quarrying of rock for concrete was done by hand in quarries opened along the right-of-way in sections where stone was plentiful. All of the drilling was by hand and the rock was broken up by hammers after blasting. Where stone was scarce it was purchased from Chinese quarrying contractors and delivered by water at some point near the line.

One incident illustrative of what can be done by the Chinese when left to their own devices is worthy of mention. During a phenomenal flood at the River the bridge in course of construction carried away and one section of the steel work, weighing something like 300 tons, was displaced and sank in the stream. The Chinese undertook to raise the sunken section and after a time accomplished the task, ultimately landing it intact on the river bank, whence it was subsequently placed in position. The foreign engineers, knowing the capacity of the Chinese in heavy weight lifting, interfered in no way with the effort, and contented themselves by merely supervising the operation.

On the Northern section thousands of coolies were employed at the numerous brick kilns erected at the different points to employ ballast for the line, and they displayed exceptional ability in using modern methods in this direction. On the Yellow River bridge, too, as on all other bridges, they were the sole laborers employed on the erection of steel work, exhibiting great adaptability in this direction and performing the work of skilled artisans to the thorough satisfaction of the engineers. In many respects the coolie labor falls far short of that available in European countries, the coolie being much slower at his task, but the numbers available at so cheap a price give compensation.

Transportation of materials to the site of construction was one of the large problems of the work. On the British section the heavy earthwork near Pukow delayed the opening of rail communication to the line beyond and made necessary the shipment of much of the material by circuitous waterway routes to a point about 20 miles north, and from there it was distributed over the first 100 miles by way of small streams and by pack labor, wheelbarrows and carts, and also by construction trains. Heavy steelwork on the bridges usually waited until the track reached the site. On the German section, supplies for the mountainous, heavy portion, just north of the Grand Canal, were delivered at Yenchowfu over the grade from Tientsin and were then transhipped by way of the Grand Canal to Hanchwang. This canal is only 4 feet deep and its navigation is difficult and uncertain. The native wheelbarrows, for local transportation of a few miles, have quite a large capacity, as they are built with two balanced baskets one on each side of a large wheel, the weight being entirely on the wheel.



TIENTSIN-PUKOW RAILWAY. MAP OF SOUTHERN SECTION

Permanent Way and Stations

The permanent track construction is of 85-lb. rail laid on ties which are of creosoted Oregon pine over a part of the line and also of Japanese hardwood. The rail and most of the fastenings used on the British section are the product of the native iron works at Hanyang, near Hankow. On the German section they are largely of German manufacture. The track is laid in rock ballast over the greater part of the line, but in one part of the German section the ballast is of broken brick, made from local clay in kilns specially constructed for this work. The Chinese make brick in this locality, but the native brick is not burned hard enough to be serviceable.

The striking difference between the architectural character of the railway stations on the northern and southern sections of this railway is likely to attract the attention of all observant travellers. Those built under the direction and to the design of the German engineers are lavish in their ornamentation and florid in their design, whilst those erected by the British are plain to a degree. The two extremes are exhibited. The German stations are in many respects certainly handsome to behold, and the design is carried down to the out-buildings, the water towers, and even the pointsmen's huts. The roofs are of red tiles, and the design differs with almost every station, but in the main Chinese ideas have been utilised to leaven European notions, and the result is harmonious in most cases. The graceful curved gables of China have been adopted in most of the first class stations and give an effective finish. But all are infinitely too expensively built for the purpose they are destined to serve. On the other hand the British stations are plain brick buildings with galvanised iron roofs, and are entirely devoid of architectural embellishment. All of them, large and small, have been carried out to one standard design, and from the utilitarian point of view answer their purpose perhaps better than the buildings on the northern section. They conform more with their surroundings; are economical and serviceable. The gorgeous structures on the German section seem to be beyond the need at this stage of existence in China, and are incongrous when it is remembered that they are built not to conform with architecturally beautiful surroundings, but merely as the place of embarkation or disembarkation of Chinese passangers, most of whom live and have their being in mud huts or at most in houses of an inferior kind. They are, it is fair to say, too costly a luxury at a time when the standard of living is so low in the interior of China and when China could well utilise the major portion of the money they cost in other directions. The money could have been profitably employed had it been put into the permanent way or rolling stock or had it been saved to provide for the service and comfort of passengers on the trains. By that will the line be judged in the future.

Junctions and Branches

The junction points with other lines are at Tientsin Central, with the Peking-Mukden

Railway: at Tsinan-fu, with the Shantung-Tsingtao railway; at Pukow (by ferry), with the Shanghai-Nanking Railway; at Techow, with the projected railway to Chengting-fu; at Hsuchao-fu, with the projected Kaifeng-fu Railway extension; at Fenyang, with the projected Fenyang-Sinyang-chow railway, though this later is likely to be varied when the time comes for construction. The junction points with the branch lines are at Yenchow-fu, a short line of some 20 miles running to Tsining-fu, on the Grand Canal; and a Lincheng, (21 miles) running to Yihsien, passing the coal mines at Tsochuang. Another branch, which was the original starting section of the line, connects Liang Wang-cheng, on the main line, with Chen Tang-chuang on the river some 15 miles away.

NORTHERN SECTION

The northern section of the line, now running between Tientsin Central station (where it joins the Peking-Mukden line) to Hanchuang, on the southern boundary of Shantung province, is the product of German money and skill. It is 389.72 miles in length. Though the first sod was officially turned on June 30, 1908, actual work was delayed until August of the same year. It was then planned to carry out a section of 160 miles between Tientsin and Tehchow, and a commencement was made at Cheng Tang-chuang at a point on the Hai River some six miles below Tientsin, where a wharf was erected. The question of the site of the Tientsin station had been left undecided and was not finally settled until 1911, the scandal in connection therewith being mentioned above.

By January 10, 1910, about 70 miles of line were ready for traffic, and a trial trip to Tsang-chow was run on that date, a further, section being opened to Tehchow, an additional 90 miles, in April; whilst by October 28 a semi-weekly service was begun between Tientsin West and Tsinan-fu, the capital of Shantung province, the Yellow River being crossed by ferry. A steam launch was used to convey passengers from Tientsin Settlement to the railway station at Cheng Tang-chuang until the line was eventually opened to Tientsin Central. Progress was made to the south of the Yellow River in corresponding manner and within another year the whole line was carrying traffic, except for the crossing of the Yellow River, which was effected in October and put into service in December.

From Tientsin to the Yellow River there were no other engineering difficulties than the minor ones of bridge building. The country is practically level, and being almost an entire plain of alluvium and loess there is no hill to be seen and no stone to be found. The latter had the great disadvantage of compelling the engineers to seek other means of obtaining ballast and it was eventually decided to build brick kilns on modern lines. A brick kiln was erected for each section, and the product was used for various purposes and for ballast, thousands of coolies being engaged breaking the brick to the desired gauge. The estimated cost was $1.50 per cubic metre delivered at the track, and the life is calculated to be as long as that of ordinary stone. The ballast is deposited over a simple layer of brick bats to a minimum depth of 30 centimetres.

Q. F. CHEN

TRAFFIC MANAGER, NORTHERN SECTION, TIENTSIN-PUKOW RAILWAY

Approaching the Yellow River the embankment work increased and special care was necessary in construction to provide against exceptional floods. A waterway is provided about every third of a mile, and in addition to being of exceptional strength the sides are planted with shrubs and trees to retard the action of flood waters.

The line is, of course, of standard gauge (4ft. 8½ inches), and is single tracked throughout.

The limiting gradient is 1 in 150, with none between Tientsin and the Yellow River. After passing Tsinan-fu, however, hilly country is entered and there are several maximum grades.

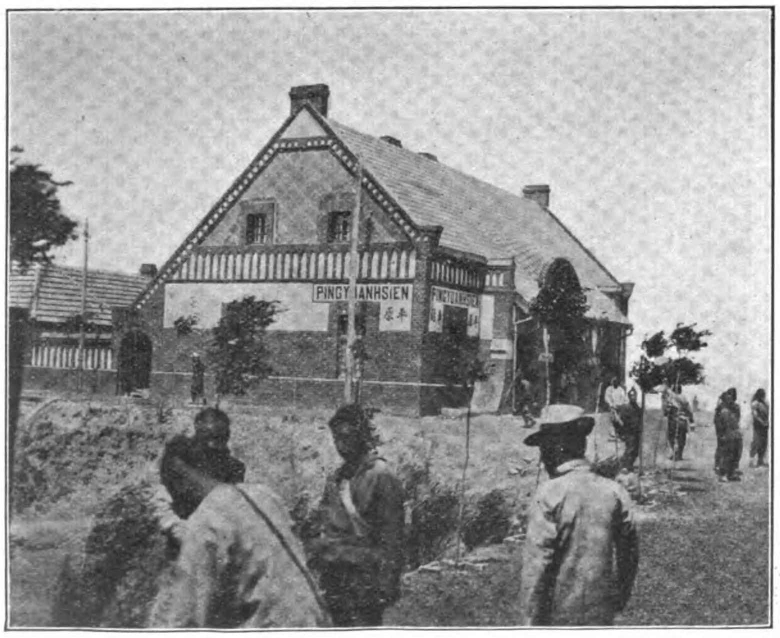
The limiting radius of the curves is 500 feet, though such sharp curves occur only in a few instances. Most of the curves vary from 1,000 feet to 3.000 feet.

The width of the permanent way is 5.10 metres at the height of the upper face of the ties. The ties are of oak or other hardwood obtained mostly from Japan. The length of the ties is about 9 feet and they are laid at a distance of about 2 feet 5 inches apart at the joints.

The rails are 85 lb. and 4,820 tons were procured from the Hanyang Iron works, near Hankow.

On the section there are 257 steel spans with a gross length of 5,970 metres and a total weight in steel of 11,268 tons. The openings of the arch spans are reinforced concrete bridges, totalling 7,060 metres. The most notable bridges are:

Yellow River Bridge	1,244.4	metres.
Pei-ho bridge	160	"
Tsau Huang-ho bridge	235	"
Chi Hai-ho bridge	180	"
Sha-ho, No. 1 bridge	280	"
Sha-ho, No. 2 bridge	200	"
Pan-ho bridge	230	"
Ta Wen-ho bridge	360	"
Hsiao Wen-ho bridge	170	"
Chieh-ho bridge	270	"
Pai Sha-ho bridge	240	"



TIENTSIN-PUKOW RAILWAY—TYPICAL STATIONS ON THE NORTHERN (GERMAN) SECTION

The Yellow River Bridge, is of course, the greatest engineering feat on the whole line, and, as it was fully described in the FAR EASTERN REVIEW of October last, it is unnecessary to say more here than that it consists of nine 91.5 metre truss spans and three cantilever spans over the main channel, made up of two anchor arm spans of 128.1 metres and a central span of 164.7 metres. The total weight of steel in the bridge is 11,000 tons, of which 8,700 are contained in the superstructure. In the sinking of the masonry piers it was found impossible to rest them on solid rock so that reinforced concrete piles had to be driven, pneumatic caissons being used in and near the stream. As a protection against the current, fender-piles were driven around each pier and rock deposited between the piles.

The station buildings of this section are, as mentioned above, artistic. They are built either of brick or stone, with roofs of red tiles manufactured in the brick-yards of the railway. The buildings are generally situated on the level of the station platforms, which latter are the height of the car steps. Excellent loading platforms of earth supported by steel rails or concrete are provided at each station, the height being one foot below the floors of cars.

The main repair shops are at Tsinan-fu where there is a complete plant for repair and construction.

The rolling stock of the northern half is more elaborate than that on the south, and the accommodation on the passenger cars is better. The following is the list of stock:—

Number and type of locomotives:—10 3-3 coupled locos for shunting; 20 3-4 goods train locomotives; 20 3-5 passenger train locomotives. Total 50.

Number and type of passenger cars;—4 drawing room cars; 4 1st class coupé cars; 9 1/11 class composite cars; 16 2nd class cars. Total 125.

Number and type of service cars:—1 saloon car; 1 inspector car; 8 baggage vans; 3 heater vans: 4 breakdown vans; 6 crane cars; 1 standard weight car; 6 kitchen cars. Total 30.

Number and type of freight cars:—60 ballast cars 15-tons; 12 ballast cars 20-tons; 100 ballast cars 30-tons; 110 high side freight cars. (20-tons); 10 high side freight cars (24-tons); 190 high side freight cars (30-tons); 47 covered freight cars (15-tons); 47 covered freight cars (24-tons); 50 covered freight cars (30-tons); 10 timber cars (30-tons); 10 oil tank cars. Total 646. Grand total 801 cars.

Among the stock is a magnificent car for the Directors which cost 57,000 marks.

It was estimated that $1,050,000 would be expended during the three months of October, November and December of 1912 for construction and maintenance purposes on the Northern section. That would not of course complete the line. The estimated expenditure for September was $355,967.

Figures showing the cost of construction of the northern section are not yet available, but it is estimated that it will be something like £3,000 per mile more than the southern section, which is calculated to be £10,692 per mile.

C. T. SHAR

TRAFFIC MANAGER, TIENTSIN-PUKOW RAILWAY, SOUTHERN SECTION

COST OF CONSTRUCTION

The net cost of the Northern Section to November 30 was Kuping Taels 41,878,633, which is the equivalent of Taels 92,000 per mile inclusive of the Yellow River Bridge. The cost per mile exclusive of the Bridge is Taels 82,000. The total cost of the Bridge was Taels 4,564,357 and other bridges and passages cost Taels 7,539,884. Other items of expenditure were:—

	Taels
Earthwork	1,695,247
Superstructure on main line and stations	9,267,846
Stations and Buildings	2,149,471
Land Purchases	1,812,065
Rolling Stock	3,936,180
General Charges	3,368,490

SOUTHERN SECTION

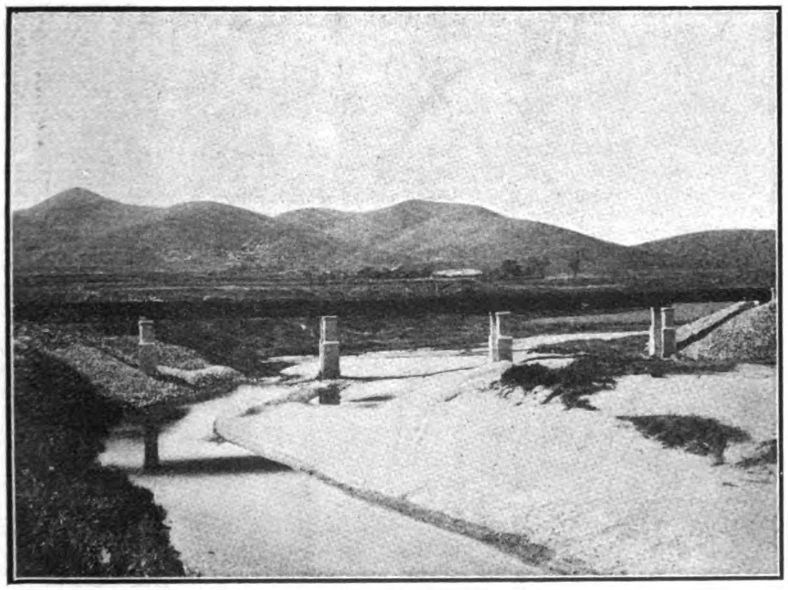
Although the agreement for the construction of the line was concluded in January, 1908, it was not until September of the same year that a beginning was seriously made to set out the southern section of the line, the delay being primarily occasioned in making the necessary Chinese official appointments.

The preliminary survey which had been made for the Loan Syndicate was quickly shown to be capable of improvement and a much better route with easier gradients and curves of larger radius was ultimately found. Keeping in mind the necessity of obtaining a first class line suitable for large traffic the Engineer-in-Chief fixed the maximum grade at 1 in 150, and the radius of the sharpest curve at 2,000 feet, as against a ruling grade in the original setting out of the line of 1 in 100, and curves which were in some cases as small in radius as 1,000 feet—factors which would seriously have limited the weight and speed of trains.

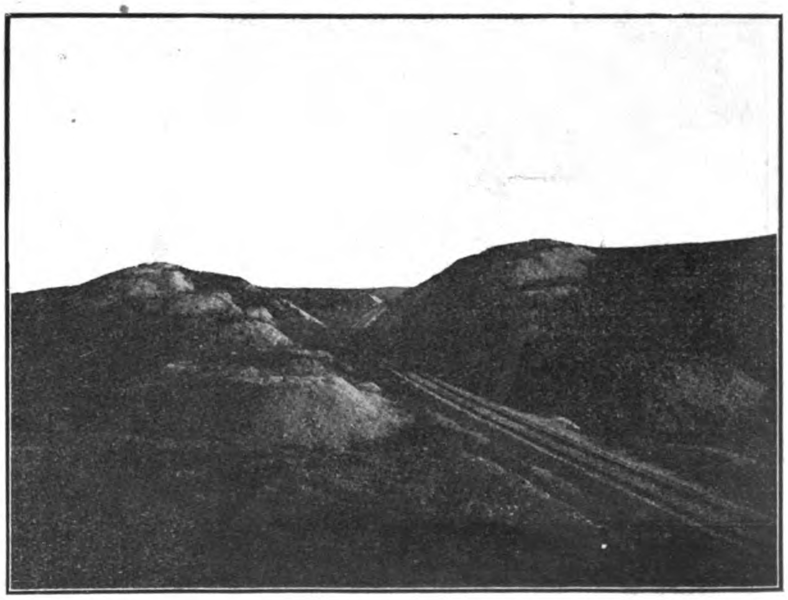
Not only was a better route obtained but the line was materially shortened, though the result was not accomplished without considerable difficulty. In the 93 miles between Pukow and the Hwai river, in fact, 39 miles are of the maximum gradient, a proportion extremely high compared with most railways yet built in China. Beyond mile 93 the country is open and no particular difficulties marked the survey, though the position of the bridge across the Hwai River was a point of interest which had to be decided. The presence of quicksand and the knowledge that the bulk of the water in flood time left its course above where the crossing would have fallen on the direct route, at mile 92, east of the town of Lin-hwai-kwan, necessitated the selection of another crossing and the line was lengthened to obtain the advantage of rock foundations about mile 110, near the town of Pengpu, which has, by virtue of being close to the line and river, since developed an important trade.

It was at first arranged to commence the earthworks in some of the most difficult places in October, 1908, but as it was desired by the Peking authorities that the Director-General of Railways should cut the first sod in person, the work was delayed until January, 1909. Thenceforward construction went on until interrupted by the flood of that year and the revolution of 1911-12.

Owing to its position the railway suffered considerably. In November, 1911, when the first outbreak occurred on the Hwai River, several of the stations were looted, and much rolling stock was damaged. Later, when the Imperial forces retreated from Pukow they took with them a great deal of the rolling stock, holding it first at Hsuchow-fu, and later



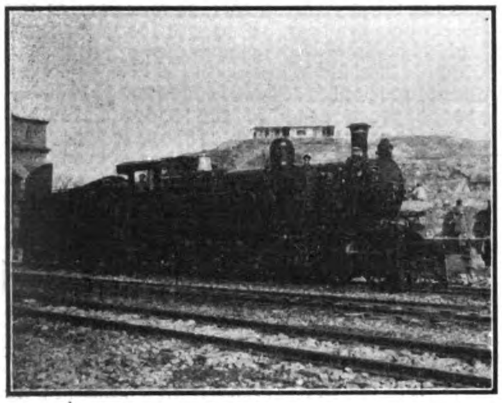
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
AN EXAMPLE OF BRIDGE-WORK



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
ROCK CUTTING

at Yenchow-fu, in Shantung, where the cars were used as barracks for the troops until the latter half of 1912. Even ballast cars were withdrawn from service, and as there was also a curtailment of funds little progress was made during the nine months of trouble. For several months there was constant fighting and portions of the line lying between the contending parties had to be abandoned by the railway authorities. At Pukow one of the pontoons was sunk by shell fire and another was struck above the water line.

In addition to all this the construction period unfortunately coincided with a series of wet years. Three years in succession there were constant rains, and the terrible floods in the Hwai valley were followed by famine and pestilence, the fever introduced by the refugees being contracted by the workmen, hundreds of whom were at one time incapacitated from work. Despite these drawbacks, however, the 236½ miles of line were opened to through traffic to Tientsin in December, 1912, though a service to Tsinan-fu had been opened early in the year, the delay in establishing through connection with the north being due solely to

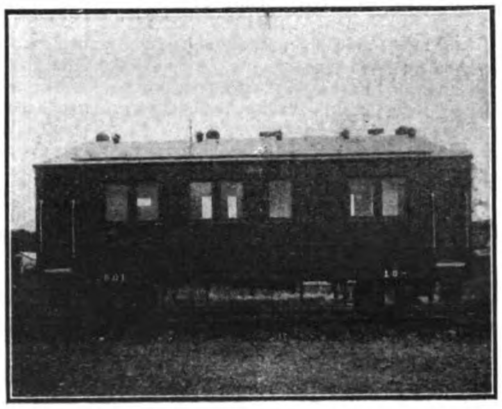


TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. PASSENGER LOCOMOTIVE

the construction of the Yellow River Bridge not having been completed until December of last year.

Progress of the Work

Difficulties of an aggravating kind had to be confronted at Pukow, the terminal on the Yangtsze river, opposite Nanking, at the outset, for the land thereabouts is so low that a veritable island had to be built upon which to erect the necessary stores and land material.



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. INSPECTION CAR BUILT ENTIRELY AT PUKOW SHOPS

The flat is in fact part of the Yangtsze river, for it is covered with water for about six months in the year; and the nearest high ground is about two and a half miles distant.

It was not until October, 1909 that a dry landing had been prepared, but in the meantime a temporary route, partly under water, was put through, and some materials and machinery were transported to the workshop site within the old city of Pukow, on the nearest high land. But having got out of the swamps there was not then a clear route into the country to enable material to be transported with facility, for the route lay through a hill which necessitated a cutting 1,000 feet long and eighty feet deep, most of it being rock. Rails could not be laid through this cutting until May, 1910, and before that time no transport of material by rail could be attempted.

A small canal served as a means to transport a little material, but the very heavy work in the first fourteen miles, consisting of the river bed, a series of big cuttings, and an embankment of about twenty feet high and five miles long, across a soft swamp, where the filling was extremely difficult, seriously hampered the construction work and kept back the transport of materials by at least a year, as compared with average country.

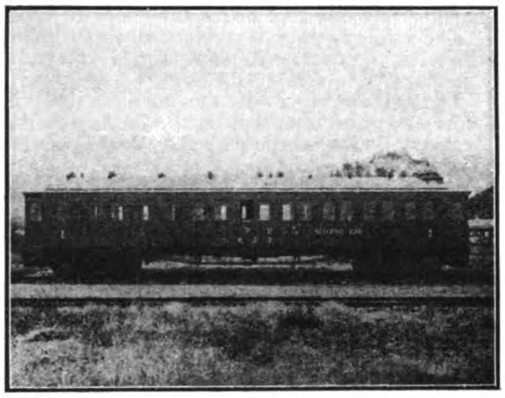
From mile 14 to mile 47, the country is broken, but except for numerous small bridges, and two large bridges over sandy rivers, where the foundations were very difficult, the work was not exceptionally heavy. The ballast for the southern portion of the line was obtained near mile 30, where a branch line is laid to the quarry.

Between mile 47 and mile 73 deep rock cuttings suceeed one another with bridges of considerable height between. The work was exceptionally heavy, the amount of rock excavated being approximately 200,000 *fang*. As the rock was unsuited for building purposes every bridge site had to be crossed by a temporary timber viaduct, some of which were of considerable size.

The Hwai River was reached by August, 1910, when transport of material by rail was possible, the river being used to take material as far as Kuchen, at mile 135.

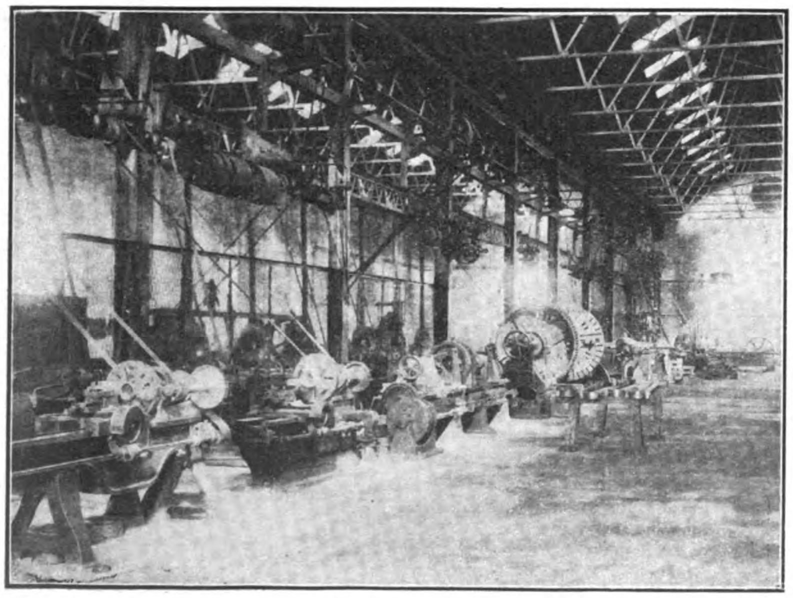
Crossing the Hwai River, the railway passes through the districts noted for the terrible floods and famine in 1910-11-12. Portion of the country between mile 110 and mile 175 were under water for months, large areas being covered by water to a depth of 10 feet or more. It was fortunate that the railway was sufficiently advanced to be of service in the transportation of relief for the starving people, and during the spring of 1912 the trains were largely devoted to carrying famine relief.

From mile 170 (where there is a branch line leading to a lime stone quarry, from which

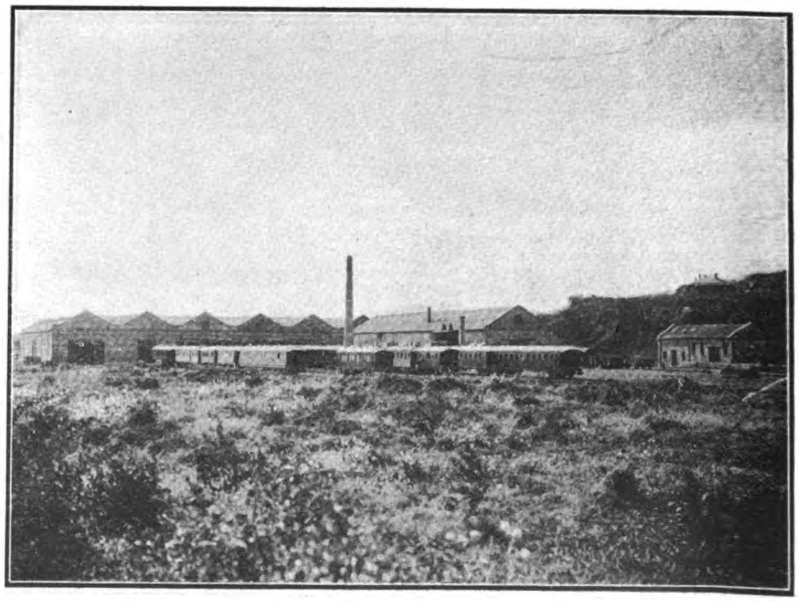


TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. SLEEPING CAR CONVERTED AT PUKOW FROM COMPOSITE CAR DAMAGED DURING THE REVOLUTION

about 100 miles of railway have been ballasted) to Hsuchow-fu, there was no particular difficulty. It is interesting to note that the station at Hsuchow-fu is situated in the old bed of the Yellow River, which is much higher than the surrounding country. After passing Hsuchow-fu, a flat plain is crossed for a distance of about eight miles, and then a



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. PUKOW WORKSHOPS INTERIOR VIEW



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. PUKOW WORKSHOPS

peculiarly rocky country is entered which necessitated three and a quarter miles of rock cuttings.

The bridge over the Hwai River (about 511 miles from Tientsin and 110 from Pukow) was completed on May 15, 1911. It consists of nine through riveted Pratt truss spans, each of 200 feet. and is 35 feet high in the clear above the average water level during construction. (See technical description below.)

On June 30, 1911, the first through train from Pukow, reached Hsuchow-fu. On October 20, the track laying of the southern section was completed, the rails reaching the Grand Canal in Shantung province.

A substantial road bed is a necessity on a Chinese trunk line, as the large quantity of freight obtained requires heavy trains to transport it, and these can only be drawn by powerful locomotives having necessarily a large axle load. Therefore, the track of both main lines and sidings, has been laid throughout with an 85lb. rail, and thoroughly ballasted with broken stone. The ties are creosoted Oregon pine over most of the line, and also of Japanese hard wood. The rails and most of the fastenings were made at the Chinese mills at Hanyang.

The total length of waterway on the railway is 22,947 feet, equivalent to 97 feet per mile of line, which is not surprising when it is remembered that the route runs parallel to the coast of a large continent. Altogether there are about 300 bridges and 500 culverts. The principal bridges are as follow:—

Hwai River bridge, 1,876 feet, in nine 200 feet spans.

Fei River bridge, flood opening 2,119 feet, in 62 spans of 30 feet.

Tse River bridge, 1,208 feet, in five 200 feet spans, and three fifty feet spans.

Huei River bridge, 925 feet, in one 200 feet span, and ten 40 feet spans, and ten 30 feet spans.

The bridges are all built of cement concrete or stone, with steel girders, no brickwork being made use of.

The workshops of the southern section are situated in a corner of the old City of Pukow. They are of moderate size, but laid out in the most up-to-date manner, so that they can deal with a great amount of work. They can, if necessary, be increased up to eight times their present size, without disturbing the existing arrangement. They were commenced in the spring of 1909, and the Foundry and Worshop were in working order before the end of February, 1910. Since then not only has all rolling stock been erected in the shops, but eight brake vans, and four Engineer's inspection cars have been constructed. Two passenger cars have been converted into sleeping cars.

Water tanks, water cranes, platelayer's trolleys, all castings required for the construction work, etc., have been made in these works, everything possible being made in China.

In the workshops, one foreign foreman is employed, but on the construction works elsewhere, Chinese foremen have been exclusively employed, and are found, under experienced Engineers, to be quite equal to all that is required of them.

The station buildings have been erected on a common design, without any pretence to ornamentation. the chief aim being to secure efficiency with economy. Some of the stations are not yet completed, precedence being given to the erection of godowns, for which there is a great demand and need. All the buildings have been made as simple as possible in accordance with instructions originally received from Peking. Many of the buildings will probably have to be augmented as time goes on, but the smallest are calculated to meet the needs of the next few years.

Cost of Construction

The cost of construction of the southern section works out at some £10,692 per mile, including rolling stock and equipment, and although £2,528,822 was expended to November 30, 1912, and the line is not yet completed, there is still sufficient to meet all needs and the cost will come within the original estimate of £3,969,730. It is only fair, when considering the cost in sterling to mention that the enormous difference between the actual expenditure and the estimate is to some extent due to the high rise in exchange, which makes the estimate appear larger than would have been the case had it been based on an average rate of exchange. And, if the funds originally arranged for are supplied, they will not only be sufficient to complete the line but also meet the cost of the extra amount of rolling stock, out of all proportion to that of most railways in China, necessitated by the extraordinary amount of traffic.

The following is a memorandum of cost to November 30, 1912:—

	£	£
Loan floated in London	2,060,000	2,060,000
Discount on bonds and commuted profit on above:..	247,000	....
Actual amount credited to Railway	2,712,100	2,712,000
Loan made to German Section in 1911 and not yet returned	250,000	....
Nett amount of Loans received by Southern Section	2,462,100	2,462,100
Advances from Loan Syndicate	173,000	....
Total actual amount of Capital received by Southern Section	2,635,100	2,635,100
Cash Balances in Banks and Head Office	106,278	....
Actual amount of Capital expended by Southern Section, to 30 Nov., 1912.....	2,528,822	2,528,822
Interest on Loan, and Bank Commission	473,084	
Interest received on Bank Balances	109,984	
Nett amount paid for interest	363,100	

The length of Main Line only, not including sidings quarry branches, etc., is 236¼ miles. The cost *per mile*, including rolling stock and all equipment, has therefore been up to the 30th November, 1912, £10,692.

The Engineer-in-Chief's estimate for the total cost of the Southern Section, was 24,612,321 Kuping Taels, equal to £3,969,730 so that there is ample margin for completion.

For comparison with the cost of Railways built by shareholders, and which do not pay interest during construction, the nett amount of interest, £363,100, should be deducted from the total: the cost then works out at £2,165,722 or £9,157 per mile.

The following are the revenue earnings for the southern section for:—

October............	$229,000
November..........	226,000
December..........	235,000

The work of construction was carried out under the supervision of Mr. T. W. T. Tuckey, M. Inst. C. E., Engineer-in-Chief.

THE HWAI RIVER BRIDGE

Allusion has been made in several places in the foregoing article to the Hwai River Bridge, and as the work of construction supplied a very interesting demonstration of bridge building under difficulties, we append some technical notes, with acknowledgments to the *Engineering Record*:—

Foundation Conditions.—The single-track bridge is 1,885 ft. long over all and about 35 ft. high in the clear above the average water level during construction. It has nine through riveted Pratt truss spans 209 ft. long over all, which are supported on two masonry abutments with concrete footings and pile foundations and eight concrete piers with rock foundations within the flood channel. At the bridge site the surface of the rock varies from about 83 to 19 ft. below mean low water level and is covered with clay and mud up to a depth of 60 or 70 ft., except under spans 4 and 5 and portions of adjacent spans across the low water channel, where it is scoured nearly or quite bare. The heights of the piers vary from 50 to 111 ft. and they have uniform dimensions of 9 X 31½ ft. under the coping.

Operations at the site were commenced about Dec. 18, 1909, at the beginning of the low water period following the highest summer flood recorded in many years The abutment excavations, well outside the flood line, were only 10 or 15 ft. deep and were easily made without sheeting, and the foundation piles were driven in them by a 2,000-lb. hammer operated by a hand windlass. The work was slow, but on account of the high price of coal and the small price of labor it was considered economical and satisfactory. After the completion of the footings the abutments were built as rapidly as the ashlar masonry was delivered from the local quarries and were finished on Aug. 15, 1910, and Jan. 15, 1911.

Piers 1, 2 and 3 are located beyond the low water shore line where the rock is not very far below the surface, and were built in open excavation, sheeted where necessary to retain the sides and exclude the water. Pier 3 is located on a rock reef in the channel near the south bank of the river, which was exposed at low water. Work on it commenced Dec. 14, 1909, and was completed March 15, 1910, without difficulty, the excavation being carried to a depth of 21½ ft. below mean low water level through clay and rock without the necessity of timbering.

Excavation for Pier 2 was commenced in December, 1909, and was completed March 15, 1910, at a depth of 33½ ft. below mean low water level. After concreting was commenced a flood submerged the pier site to a depth of 10 ft. and delayed the work until December, 1910, when it was resumed and completed in February, 1911.

Pier 1 was excavated 36½ ft. below mean low water and 49 ft. below the surface of the ground through fine running sand, for which sheeting and heavy timbering were necessary. The excavation was very much delayed by the March flood, which, although it did not overflow the bank, caused a serious influx of sand. Soon after rock was uncovered the pit was filled by the flood and work was abandoned for about a month and finally completed about ten months after commencement.

Pneumatic Foundations.—Piers 4 to 8 inclusive have foundations on steel pneumatic caissons sunk from 22½ to 45½ ft. below mean low water level. The caissons, from 10 to 50 ft. high, are 16 ft. wide and 38 ft. long with rounded ends and have an inner shell 4 ft. from the outer shell and connected to it by vertical lines of zig-zag transverse bracing about 3 ft. apart, and by the inclined side walls of the working chamber, 8 ft. high, which reach from the cutting edge to the bottom of the inner shell. They are made chiefly of steel plates from 5/16 in. thick at the cutting edge to ⅜ in. thick at the top, with lapped joints hand-riveted and calked.

As the sites of piers 7 and 8 were above water level when operations were commenced, their caissons were assembled wholly in the required horizontal positions resting on the surface of the ground and were excavated and sunk without guides or falsework. They were 10 ft. in height and the concrete below the footing was reinforced by 32 vertical lines of ⅜ X 4 in. steel bars.

The sites for piers 4, 5 and 6 being submerged at all times, their caissons were partly built on

shore, and, after the working chamber and a few feet of the cofferdam walls above it was riveted and calked, they were floated to position and the upper parts of the walls were added as the caissons were sunk.

The construction of the caissons was commenced by assembling the cutting edge on horizontal blocking or launching skids and riveting to it the inclined walls of the working chamber which, when braced across the top, were independently stable. The deck and the inner and outer shells were then successively added, the steel plates being handled by guyed derricks and the rivets being driven by hand.

Work was commenced first on the caisson for pier 7, which was started Dec. 15, 1909, as soon as possible after the receipt of the first air compressor. Sinking under air pressure was commenced Jan. 7, 1910; rock was reached at the end of March, soon after which the pier was submerged by the spring flood and work was suspended until May 29. The concreting of the working chamber was completed June 15, when, the top of the pier being still submerged, work was suspended until Nov. 15. Then an earth cofferdam was built around the pier, the shafts pumped out and the pier completed up to the coping on Dec. 5.

Three more air compressors, which, like the first, had each a capacity of 220 cu. ft. of free air per minute, were supplied by the Imperial Railways of North China and, being delivered like the rest of the machinery by junks through the Grand Canal, arrived piece by piece at intervals. They were installed on the north bank of the river near pier 8, and as their capacity was adequate for only two caissons at once, the sinking of the other piers could not be commenced until 7 and 8 were finished.

Work on pier 8 was commenced in the latter part of February, 1910, and was prosecuted continuously until the caisson was landed 4 ft. below the surface of bed rock in the end of June, and the pier was completed to the coping on Aug. 16, 1910. The cutting edge was sunk 68 ft. below mean low water, or 90 ft. below the surface of the ground. The caisson work was executed in four-hour shifts and there were two deaths due to air pressure. This caisson was founded during high water at a depth of 88 ft. below water level and required a maximum pneumatic pressure in the working chamber of about 40 lb.

Pier 5 is located in the river channel where the water is 30 ft. deep at its lowest stage. The river bottom here has an uneven rock surface scoured clean by the swift current. The caisson was built on shore to a height of 20 ft. above the cutting edge and, weighing about 50 tons, was rolled on the launching ways to water about 4 ft. deep and delivered to a 22 × 60 ft. wooden tower about 20 ft. high. The tower was mounted on two wooden pontoons, one on each side of the caisson, which was suspended from it by four vertical screws 4 in. in diameter and about 8 ft. long. The screws were attached at their lower ends to steel links 4 in. wide, ⅝ in. thick and 3 ft. long, and at their upper ends engaged capstan nuts in two overhead king-post lifting trusses in the tower.

The air space between the walls of the caisson provided considerable buoyancy, and after the screws were adjusted to transfer a small portion of its weight to the tower, the caisson was towed, partly suspended and chiefly floating, to approximate position, where it was held by six 2 in. Manila tackles running to upstream and downstream anchors.

The anchors were T-shape in plan with a stem made of two 85-lb. rails 30 ft. long spaced about 12 in. apart by means of timber blocks and a cross-beam to prevent overturning, made of a third similar rail. Inclined slightly from the vertical and bolted securely at the intersection of the stem and crossbeam were two hardwood cross-ties. These were sharpened at the lower end and projected about 18 in. below the bottoms of the rails so as to embed themselves in the river bottom. The anchor rope was attached to the long end of the stem. This device proved efficient and satisfactory for mooring purposes to maintain the caisson in position in the strong current. A crew, however, was constantly employed on the pontoons to look after the anchorage in case of emergency.

The caisson suspension links were pin-connected at their lower ends to two horizontal transverse plate girders built into the caisson just above the roof of the working chamber and projecting through the outside wall. These girders stiffened the caisson without injuriously obstructing the interior, and, being sufficiently far below the surface of the water not to obstruct navigation when the caisson was landed, were allowed to remain permanently in the work.

As soon as the caisson was moored, hand-mixed concrete was filled in between the shells. The concrete was made of Green Island Portland cement manufactured near Hongkong, broken stone 1½ to 2 in. in diameter and local sand delivered in boats from pits about 10 miles distant.

Sinking was commenced at the end of February, 1910, and successive courses of the wall plates were added as the caisson descended. At the end of May it was landed on rock in water 50 ft. deep, the screws were detached and the pontoons and tower floated away. The pier footings were established below the lowest water level so that they would not be exposed at low water. At this level the inner shell was discontinued and a detachable joint was provided for the upper part of the outer shell, which, after the completion of the pier, was removed by unscrewing the long bolts which projected above the surface of the water. For this detachable section of the cofferdam interior timber bracing was provided.

THE HWAI RIVER BRIDGE, ON SOUTHERN SECTION TIENTSIN-PUKOW RAILWAY (1,876 FEET IN LENGTH—9 SPANS OF 200 FEET)

The use of long lowering screws was avoided by the combination of screws and links. By lowering the caisson until the links were sufficiently slackened one of the suspenders at a time could be disconnected and the screw varied sufficiently to permit a new set of links to be added.

The 4 in. air main from the compressor was supported for about 200 ft. on a raft of 12 × 12 in. timber where the water was so deep and the bottom so rocky that piles could not be driven. This raft was held in position by anchors placed about 20 ft. apart. Inshore, where the water was shallow and there was sufficient earth for pile driving, the pipe was supported on a light pile trestle, and for pier 4 the compressors were moved to the opposite bank of the river.

On Aug. 13, the air locks were submerged by a summer flood which also submerged the derricks and other plant, but did not carry away anything of importance. Excavation was resumed Sept. 16, sinking was completed early in October and the working chamber filled with concrete prior to Oct. 15 and completed to the under coping early in February, 1911.

Pier 4 was built, launched, and towed into position and lowered in the same manner as pier 5. It was landed on the river bottom early in October, excavation was commenced in November and was completed in the latter half of December and the pier was finished to the coping early in March, 1911.

The caisson for pier 6 was built on shore to a height of 12 ft., launched on a boat and towed to approximate position and landed there on a temporary deck under a tower on a pile foundation that was built in December, 1909. The caisson was delivered and sinking through the mud was commenced in February, 1910. The work was submerged during the March flood and was resumed in June. The caisson was lowered during July, again abandoned on account of the August flood and work on it was resumed in September. Air pressure was put on in November, the caisson was landed on rock in the end of February, 1911, and the pier was completed to the coping at the end of March.

Each caisson was provided with two air shafts 3 ft. in diameter surmounted by air locks of a special type previously used by the Imperial Railways of North China. The locks were about 8 ft. long, 8 ft. high and 4 ft. wide, with dome-shaped tops and bottoms and vertical cylindrical sides and were made with three chambers. The front or entrance chamber was provided with an interior and ex erior door. The interior door opened directly into the central chamber, which was provided with a circular opening directly over the shaft. The back of the central chamber was provided with a rectangular opening into the rear chamber. The hoisting drum was located on the inside of the central chamber directly under the roof and the drum shaft passed through the wall of the lock and was operated by a steam hoisting engine fastened to the outside of the central chamber. The rear chamber was fitted with a muck chute provided with quick-acting locks. The muck kibbles were swung through the rectangular opening between the central and rear chambers and dumped into the muck chute.

After the caisson was landed a concrete chute with quick-acting locks was placed in the roof of the central chamber. The concrete was mixed by hand, carried in baskets by coolies and dumped into the concrete chute. An incline was provided leading from the mixing board to the concrete chute.

Falsework.—The superstructure, weighing about 2,500 lb. per linear foot, was all erected on pile falsework with bents at panel points about 25 ft. apart, made of piles long enough to serve without the addition of framed bents above them. Each regular bent had five 12 × 12 in. vertical posts spaced 6 ft. center to center and capped by a 12 × 12 in. timber 30 ft. long.

The bents had a 6 × 12 in. transverse strut at the water level and were X-braced in the panel above the water level. Longitudinally they were braced by three lines of 6 × 12 in. horizontal ledger pieces bolted to the intersections of the transverse brace with the center and outside piles. At the ends of the span these ledger pieces were supported on and thoroughly bolted to 12 × 12 in. horizontal timbers bolted across the faces of the pier, to which they were secured by five 1 in. bolts passing through the piers and removed when the falsework was taken down.

The bents supported five lines of stringers on the center of the piles. The two outside lines were single 14 × 14 in. timbers to carry the traveler track. The other were single lines of 12 × 12 in. timbers lapping joints on the caps. The rail stringers were spliced at the joints with 6 × 12 in. fish plates and were

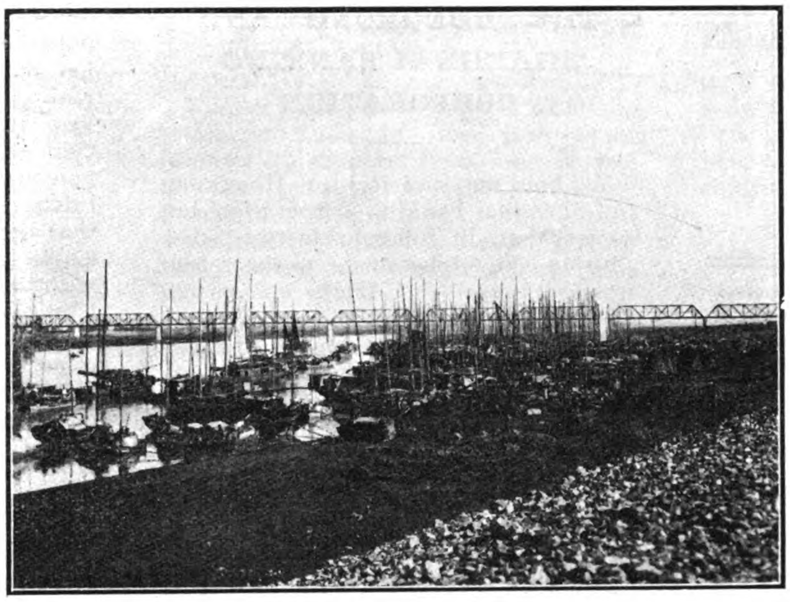
continuous across the tops of the piers, to which they were firmly secured by pairs of ¾ in. wedge bolts. The rail stringers were fastened to the caps at each intersection with ¾ in. nailing bolts. All timber for falsework and all other purposes was Oregon fir, imported in large sizes and sawed by hand at the site.

Where the water was very deep piles were made of two pieces spliced with butt joints and fish plates, and for spans 5 and 6, where the water had a maximum depth of 40 to 50 ft., they were made of 14 × 14 in. timbers. Here the rock bottom was uncovered, and the piles were provided with forged steel points and driven to penetrate in the soft surface of the rock. Rails were bolted to these piles to prevent them from floating and they were temporarily stay-lathed to maintain them in position until a system of permanent bracing could be put in.

Additional stability was provided by bracing each bent in these spans with 14 × 14 in. spur piles inclined 1:4 and driven by a drop hammer running in inclined ways, which moved on top of the falsework. The spur piles were not driven in the plane of the bent, but adjacent and parallel to it, and were bolted across the faces of the vertical piles, intersecting the outer pile at the water level and the adjacent intermediate pile at the cap. The stringers carrying the bridge floor rested directly on the heads of the spur piles.

In these spans the caps were secured to the piles by wooden scabs, and the panels between them were X-braced by 6 × 12 in. horizontal timbers. All falsework connections were made by ¾ in. bolts. The piles were driven by several floating machines built by the engineer in charge and equipped with 2,000 lb. hammers operated by hand. Each machine required a crew of men.

Erection of Steel.—The steel was stored in the yards at both ends of the bridge and was skidded on greased rails by manual labor to standard-gauge push cars and erected from them by two travelers, working out from the abutments at both sides of the river. Each traveler had an ordinary gallows-frame about 40 ft. high and 45 ft. long over all, made of two 12 × 12 in. vertical posts 24 ft. apart, two 10 × 10 in. inclined posts and a 9 × 18 in. cap. It was seated on two 12 × 12 in. longitudinal sills 25 ft. long, to the ends of which it was braced by 12 × 6 in. diagonals reaching nearly to the cap and giving it longitudinal stability. It was mounted on eight 10 in. double flange wheels running on the 24 ft. gauge track, and was provided with two eight-part Manila rope tackles suspended from the caps and operated by hand windlasses manned by eight men each, which easily lifted the maximum weights of about 6 tons which were imposed by the top chord pieces.



A GENERAL VIEW OF THE HWAI RIVER BRIDGE

Cross pieces of 12 × 12 in. timber were laid on the falsework stringers at panel points and on them the traveler set the 36 in. I-beam floorbeams on pairs of camber wedges and assembled to them the I-beam stringers. After the floor system was completed the traveler assembled the lower chords to the floor beams and then erected the vertical posts and inclined posts, which were temporarily stable on account of the rigidity of their bolted connections to the bottom chords. The top chord pieces were then assembled into position on the web member, transverse braces added and the field rivets driven by about 20 gangs of four men each.

The erection of span 1 was commenced early in December, 1910, immediately after its delivery at the bridge site, and was completed in the same month. The erection of span 9 was commenced late in December, 1910, and completed Jan. 18, 1911. The entire superstructure, with permanent decking, was completed and opened for construction traffic on May 15, 1911.

The bridge was erected before the granite pier coping 2 ft. thick was set, the trusses being temporarily supported on cribbing placed on top of the concrete. After the superstructure was erected the coping was delivered at night on the service track on the bridge floor and after it was set the pedestals were placed on it and the spans lowered to permanent bearing on them.

The principal quantities in the work include 5,556 cu. yd. of concrete footings in the piers and abutments, 4,074 yd. of concrete in the piers above the footings, 385 yd. of granite pier coping, 556 yd. of granite ashlar in the abutments, 10,600 barrels of cement and 2,500 tons of steel. The steel was fabricated by Wright, Headson & Company, Ltd., of Motherwell, Scotland.

All work was done by native labor under Chinese foremen, many of them trained on similar work in North China, who proved to be excellent workmen. The foreign staff under whose direction the work was performed consisted of Mr. T. W. T. Tuckey, M. Inst. C.E., engineer in chief; Mr. T. J. Bourne, M. Inst. C.E., executive engineer of the second district, and Mr. E. B. Naylor, M. Am. Soc. C.E., engineer in charge of construction.

HEMP IN THE PHILIPPINES

A Shortage Predicted

According to a Manila paper of December 6, M. F. Loewenstein, president of the Pacific Commercial Company, predicts that there will be a shortage of hemp next year. He had just returned from a trip through the hemp districts of southern Luzon and he based his observations on what he saw and reports from correspondents in other hemp producing districts.

"Unquestionably the drought which the islands experienced in the early part of the year did a great deal of damage to the hemp fields of southern Luzon," he said. "Opinions differ as to the extent of this damage. Weather since July has been ideal for the growing of hemp and but for the fact that considerable over cleaning has been indulged in there would probably not be much of a falling off in receipts next year.

"In anticipation of the drought and due to the very extraordinary consumption of hemp throughout the world, prices commenced advancing in July until they practically doubled. Owners, and the laborers stripping hemp, who in lieu of pay receive 50 per cent. of the hemp stripped, had been accustomed to ruinous prices for the last three years. When, therefore, values advanced they could not withstand the temptation to strip most of the hemp which was fit for cleaning regardless of consequences in order to take advantage of these high prices. Thus they discounted the future and it is due to this fact that receipts of hemp at Manila and Cebu instead of declining during the past three months, as had been expected, showed an increase of 118,517 bales as compared with last year.

"However, there is bound to come a time of reckoning and the general opinion is that it will come next year, principally during the first six months. No estimates are alike as to the shortage which may be expected. The most conservative people I met in southern Luzon insist it will be 25 per cent. whereas estimates go up all the way to 40 and 50 per cent. Southern Luzon, namely Ambos, Camarines, Albay and Sorsogon, produced last year about 600,000 bales, and figuring conservatively it is, therefore, safe to assume that the shortage will not be less than 150,000 bales from that quarter.

"The typhoon of October 16th in southern Leyte destroyed to a very considerable extent what hemp had escaped the drought in that district and it is most likely that the shortage there will amount to 100,000 bales.

"According to the advices of our representatives in that part of Samar which was lately hit by a typhoon a good deal of over cleaning has been going on as well, so that even if this typhoon had not done considerable damage there would probably be less hemp from there during the coming years.

"Just what damage the last typhoon has done I am unable to state but in view of the above observations it is safe to predict that the production of hemp next year will not exceed 1,110,000 bales which is considerably less than the world's requirements have been during the last three years."

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COMMERCE :-: ENGINEERING :-: FINANCE

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THE HONGKONG AND SHANGHAI BANKING CORPORATION

We hold no brief for the Hongkong and Shanghai Banking Corporation, but we feel that, in common justice, some allusion should be made to the recent attacks upon the Bank by certain members of the British House of Commons and some of the London financial papers. Attacks made by persons such as Mr. Ginnell, M.P., are not likely to be seriously regarded by those who know the explanation of Mr. Ginnell's interest in Far Eastern matters, but the majority are not aware of the source of Mr. Ginnell's inspiration and the strictures passed upon the Bank have apparently found acceptance in certain quarters. The charge against the Bank, when analysed, resolves itself into the assertion that, while it claims to represent British finance in the Far East, a large percentage of its Directorate are German subjects. The suggestion is, of course, that the policy of the Bank is influenced by the fact that Germany is represented in the Court of Directors.

In these days, when the internationalizing of finance is the accepted policy, a complaint of this kind simply betrays the parochialism of those by whom it is presented. When the Hongkong and Shanghai Banking Corporation was established the volume of business being transacted in the Far East by British firms was insufficient to justify the inauguration of the expensive machinery of administration necessary to cover the large area in which the Bank proposed to operate. It was, therefore, decided that seats on the Board should be offered to the heads of certain great German firms, and the adoption of this policy has been entirely justified by the results. Very properly, the Bank regarded the situation from a commercial and not from a political standpoint. Its object was to supply the Far East with adequate banking facilities, which were sadly lacking in the middle of last century, and it adopted the commonsense policy of securing the business of the best clients, irrespective of any consideration of nationality. The adoption of this policy has placed the Bank in the position it occupies to-day. No charge of sacrificing any material British interests can be laid against the Bank. When everything is considered the Hongkong and Shanghai Banking Corporation should be congratulated rather than condemned for the part it has played in divorcing commercial and political matters in regard to China.

The attacks to which we have alluded were largely caused by the feeling aroused in connection with Mr. C. Birch Crisp's disastrous incursion into Far Eastern finance. That deplorable departure on the part of China from the policy of above-board financing has cost her more than is immediately to be realized, and it led the partizans of the loan into hurling abuse at everyone connected with the Six Power Group and everyone who spoke in favour of international financing in China. Now that the stupendous error committed by China and those who were associated with the Crisp adventure has been tacitly admitted, it is to be hoped that the persons and papers who showered abuse upon the Hongkong and Shanghai Banking Corporation and others, will have the grace to admit that their charges were made from prejudice and were not based on established facts. Whether they do or not, that will be the judgment of the unbiassed general public. The fact that the Chinese Government turned to the Six Power Group to help it through speaks for itself.

CHINESE CUSTOMS REVENUE

It was anticipated by very few that the Revenue from the Chinese Maritime Customs for the year 1912 would show any increase at all, much less one so considerable as Hk. Tls. 3,800,000. Reports from commercial sources suggested that, as a result of the uncertainty following the Revolution and the failure of the Government to win recognition from the Powers, coupled with the unfortunate methods of financing that obtained temporarily, there would be a falling off in the Customs Revenue instead of an increase. The figures are extremely gratifying, not only to the Chinese, but to all whose interests are bound up in the fortunes of this country. The proof that China possesses considerable recuperative power has been strikingly demonstrated.

It is noticeable that the increases were practically general, although there was a slight falling off at Shanghai and at some ports in Manchuria. The remarkable increase of Tls. 771,000 was shown at Hankow, and the other Yangtsze ports were responsible for Tls. 1,077,000. Kiaochow made a good show with Tls. 419,000 and Swatow with Tls. 444,000. Canton's increase was only Tls. 290,000, possibly caused by the unsettled conditions in the Two Kwang Provinces. Tientsin and Chingwantao retained the second place, with a total of Tls. 3,776,000, an increase of Tls. 156,000.

While China is still far from being out of the financial wood, this unlooked for increase in the Customs Revenue should inspire her to face her problems with a greater confidence. Given firm administration and sound financing during the present year, there is no reason why she should not now enter upon a period of great development.

RAILWAY EARNINGS IN CHINA

Necessarily it will be some time before it is possible to give accurate periodical returns of the earnings of railways in China, but it will be seen elsewhere in our columns that we have been able to give a considerable amount of information in this connection. In the near future, when the reorganization now being carried out by the Board of Communications is complete, we hope to be able to supply this information in regular form. There is every reason to suppose, unless something now unforeseen occurs that the earnings of the existing railways during 1913 will show a progressive increase.

The management of the Peking-Mukden line have much to congratulate themselves upon in respect of the result of last year's working. The earnings totalled $13,124,000, which is a record, whilst the working expenses were less than a third, some 32%. There was an all round increase in traffic and the demand for transportation seems to be a sustained one, for the management are hopeful of making further records by this year's operations. The 1912 results have not been approached before except in 1905, when the Russo-Japanese war was on, and that might be classed as an abnormal time, whilst 1912 was normal.

We understand that it is contemplated to improve the passenger cars on this line. In fact there is a general demand for more rolling stock throughout the country, and if it is complied with the total railway earnings are likely to show an all round increase.

U. S. RAILWAY RECEIPTS AND EXPENSES FOR SEPTEMBER

The business of the railways of the United States of America for September while showing a considerable improvement over that of September 1911, does not maintain the rate of increase set by the record-breaking month of August. The total net operating revenue of 90 per cent. of the steam railways increased $5,896,840 for September, while the increase for August was $13,865,622. This increase in net operating revenue was at the rate of $21 per mile of line for the month or at the rate of 70 cents per mile of line per day.

The total operating revenues per mile of line for the month increased 6.5 per cent., the operating expenses 7.3 per cent. and the net operating revenue 5.1 per cent.

The foregoing statistics are from the summary made by the Bureau of Railway Economics from the reports of the railways to the Interstate Commerce Commission. A special committee of the railways having headquarters in Chicago reports that bills now pending in the Federal Congress providing for an increase in the number of employees of the railways and for the rapid substitution of steel for wooden equipment will, if enacted, place the railways under an additional expense of approximately $12,000,000 per annum for the former, and a total expense of $632,746,000 for the latter purpose. Without compulsion, the railways in the course of three years have increased their steel equipment 750 per cent. and their steel underframe equipment 256 per cent.

THE ABOVE PHOTOGRAPH OF PRESIDENT YUAN SHIH-KAI IN COMPANY WITH THE AMERICAN AND JAPANESE MINISTERS WAS TAKEN ON JANUARY 2, WHEN THE PRESIDENT HELD A RECEPTION AT HIS YAMEN, AT PEKING. MOST OF THE FOREIGN MINISTERS ATTENDED, BUT THE PHOTOGRAPH HERE SHOWN WAS TAKEN AT THE CONCLUSION OF THE RECEPTION, AFTER THE OTHER MINISTERS HAD DEPARTED, AND UPON THE SUGGESTION OF ONE OF THE GUESTS. IT DOES NOT IMPLY IMMEDIATE RECOGNITION OF THE REPUBLIC!

CHINA'S BUDGET

Estimates for January-June, 1913

Revenue

With the re-establishment, to some extent, of orderly conditions it has been found possible to compile the Budget for the first half of the second year of the Republic. The total revenue is estimated at $51,336,879.96, made up as follows:—

(1) Board of Foreign Affairs	$ 18,440.00
(2) Board of Finance	2,679,169.30
(3) Board of Education	89,912.02
(4) Board of Agriculture and Forestry	14,530.97
(5) Board of Communications and Posts	276,280.00
(6) Total Revenue of provinces to be remitted to Board of Finance	18,551,846.07
(7) Total Revenue from various Maritime Customs	29,706,701.55

Expenditure

The estimated expenditure of the various Boards in Peking during the period in question is as follows:—

	Expenditures *Ordinary*	Expenditures *Provisional*
Board of Foreign Affairs	$ 1,579,355.60	$ 453,787
Board of Interior	1,835,190.81	300,500.64
Board of Finance	[illegible]6,948,848.76	3,867,103.19
Board of Education	2,238,801.00	4,048,850.00
Board of War	?	?
Board of Navy	1,724,954.00	8,229,250.00
Board of Justice	740,448.40	361,587.00
Board of Agriculture and Forestry	1,369,228.12	1,545,325.00
Board of Industry and Commerce	13,319,656.00	110,000.00
Board of Communications and Posts	437,431.74	102,066.00
	110,193,914.43	19,018,468.83

This shows a shortage of $77,875,503.

Loan Expenditure

In addition to the ordinary expenditure there are the foreign and domestic loan obligations which have to be met in the first half year of 1913. These amount to $79,199,844.91, made up of the following sums:—

A.—(1) Foreign Loans—Shanghai Tls. 38,150.00—£2,823,946-3-4 Fcs. 5,556,905.00=	$32,951,467.00
(2) Indemnity Loan—Haikwan Tls. 9,949,650.00=	16,118,433.00
(3) Provisional Advances from the Group, Shanghai Tls. 12,800,000=	17,645,600.00
(4) Foreign Short Period Loans contracted by the Central Government	10,044,342.00
Total	$ 76,750,842,00

B.—(1) Domestic Short Period Loan	$1,090,475.00
(2) Domestic Public Loan	1,349,527.91
Total	$ 2,440,002.91

THE TIBETAN QUESTION

Official Correspondence between Great Britain and China

We publish herewith the full text of the Note sent by the British Minister at Peking to the Chinese Government on the question of Tibet, and we give a fairly accurate translation of China's reply, as well as the text of the semi-official letter to Sir John Jordan, which was written in an endeavor to bring the question up for discussion.

China delayed for several months in replying to the British note, and then set down conclusions which the British deem as finally disposing of the question so far as China is concerned. Meantime Tibet has severed herself entirely from China's influence, and it is difficult to tell how China is going to reassert herself if Britain determines to have nothing more to say to her, and confines her activities to negotiations with the Dalai Lama. It would appear to the unprejudiced that China might have left a loophole in her reply through which to escape, but the British fail to admit of one, and at present seem determined to consider the subject one upon which they need not again bother the Central Government. It is rather unfortunate that the Government did not take counsel with the Adviser at their service, who intimately knows, perhaps better than any other man, the thorny paths of foreign diplomacy.

The correspondence is as follows:—

Copy of British Note

Peking, August 17, 1912.

In a conversation with His Excellency Yuan Shih-kai on the 23rd of June His Britannic Majesty's Minister referred to the Chinese Military Expedition which was being organised against Tibet and gave His Excellency clearly to understand that the Tibetan question could be easily settled by friendly negotiation at a later date but that the use of force at that time would seriously prejudice an amicable arrangement. His Excellency Yuan Shih-kai assured Sir John Jordan that there was no intention of incorporation in China and that the treaties would be scrupulously observed.

On June 29 His Majesty's Minister informed Mr. Lu Cheng-hsiang that His Majesty's Government would not tolerate any attempt to reduce Tibet, who had an independent Treaty with Great Britain, to the condition of a province of China and he warned the Chinese Government that grave complications might ensue if the Chinese expedition crossed the frontier into Tibet.

In consequence of a visit paid to him a few days previously by the Vice-Minister of Foreign Affairs, His Majesty's Minister again saw His Excellency Yuan Shih-kai on the 16th instant and, in reply to his inquiry, received the most emphatic assurance that there was no intention either of sending the expedition to cross the frontier into Tibet or of incorporating that country in the Provinces of China. These assurances have been noted and duly reported to His Majesty's Government who will doubtless welcome them as indicating China's intention scrupulously to observe Treaty engagements. At the same time His Majesty's Government consider it to be in the interests of harmonious relations that they should now state clearly their policy in regard to Tibet. His Majesty's Minister had the honour to inform His Excellency Yuan Shih-kai that a communication in this respect would shortly be submitted to the Chinese Government and he now begs, under instructions from Sir Edward Grey, to make the following definite statement of that policy.

(1) His Majesty's Government, while they have formally recognised the suzerain rights of China in Tibet, have never recognised the right of China to intervene actively in the internal administration of Tibet which should remain, as contemplated by the Treaties, in the hands, of the Tibetan authorities, subject to the right of Great Britain and China, under Article 1 of the Convention of April 27, 1906, to take such steps as may be necessary to secure the due fulfilment of Treaty stipulations.

(2) On these grounds His Majesty's Government must demur altogether to the conduct of the Chinese officers in Tibet during the last two years in assuming all administrative power in the country and to the doctrine propounded in His Excellency Yuan Shih-kai's Presidential Order of the 21st of April, 1912, that Tibet is to be regarded as pien an equal footing with the provinces of China Proper, and that all administrative matters connected with that country will come within the sphere of internal administration."

His Majesty's Government formally decline to accept such a definition of the political status of Tibet and they must warn the Chinese Republic against any repetition by Chinese officers of the conduct to which exception has been taken.

(3) While the right of China to station a representative, with a suitable escort, at Lhasa, with authority to advise the Tibetans as to their foreign relations, is not disputed, His Majesty's Government are not prepared to acquiesce in the maintenance of an unlimited number of troops either at Lhasa, or in Tibet generally.

(4) His Majesty's Government must press for the conclusion of a written agreement on the foregoing lines as a condition precedent to extending their recognition to the Chinese Republic.

(5) In the meantime all communication with Tibet via India must be regarded as absolutely closed to the Chinese and will only be re-opened on such conditions as His Majesty's Government may see fit to impose when an Agreement has been concluded on the lines indicated above.

This does not apply to the withdrawal of the present Chinese garrison at Lhasa, who, as His Excellency Yuan Shih-kai has already been informed, are at liberty to return to China, via India if they wish to do so.

Sir John Jordan has the honour to request the Wai Chiao Pu to favour him with a reply to this memorandum.

(Sd.) J. M. Jordan.

Reply from China

The Chinese Government, did not reply to British memorandum until December 23, 1912, when a Note was sent to the British Legation giving a categorical reply to the demands. The note takes a firm stand upon the existing Treaties. It attributed the precipitation of the Tibetan question to a misunderstanding on the part of England of the policy of the Chinese Government toward Tibet.

After citing Article 2 of the Tibetan Convention of 1906 between China and England, the Chinese Note emphasized the fact that it was England which had engaged "not to annex Tibetan territory or to interfere in the administration of Tibet;" that China had merely undertaken "not to permit any other Foreign State to interfere with the territory or internal administration of Tibet," and that no express stipulation was found in the treaty which restricted China's right of administering Tibet. It also pointed to the various obligations which the Trade Regulations of 1908, for instance, imposed upon China, such as the policing of the trading marts and the protection of the lines of communication between Tibet and India, as evidence of her right of interfering in the Tibetan administration.

Referring to the statement found in one of the Presidential Orders to the effect that "the five races of the Republic should be united into one family,"—a statement to which the British memorandum took exception on the ground that such union would eventually bring about the conversion of Tibet into a Province, —the Chinese note says that, as has been repeatedly declared by the President, China has no intention of converting Tibet into a Province China's Tibetan policy, adds the note, is governed by the Provisional Constitution of the Republic, the Edict of Abdication of Emperor Hsuen Tung, the President's Inauguration Oath and his Order restoring his former title and position to the Dalai Lama. The "union of five races into one family" and the conversion of Tibet into a Province are two entirely different things. That the present status of Tibet should be preserved and no change introduced into the traditional system of government therein is as much the desire of China as that of Great Britain.

The Chinese Government also maintained in the Note that the right of despatching troops to Tibet was a necessary complement of the responsibility which it had undertaken by treaty with Great Britain to enforce due observance of the Convention of 1906, and the Regulations of 1908 by the Tibetans, and to preserve peace and good order throughout the vast territory of Tibet. As a matter of fact, only such a body of troops was despatched to Tibet as was absolutely necessary to aid the police in enforcing law and order there: the Chinese Government had never entertained the idea of stationing an unlimited number of soldiers in Tibet.

To the demand of the British Government to negotiate a new Tibetan Convention with China, the Note says that the Chinese Government had repeatedly given assurance that the Treaties concluded by the former Tsing Dynasty should continue to be valid; that the Tibet Convention of 1906 and the Tibetan-Indian Trading Regulations of 1908, being of the nature of international agreements, remain in force as much as ever and ought to continue to be observed by the contracting parties; and that inasmuch as those documents already defined the status of Tibet with sufficient clearness, there was no need of negotiating a new Treaty on the question.

With reference to the closing by England of communications between Tibetan and Indian frontiers, the Note stated that such action was not usually resorted to except by nations at war with each other. It expressed regret that the British Government should have seen fit to apply such a measure to China, a state on very friendly terms with it; but it entertained the hope that this decision would be recalled without delay.

Finally the Note implicitly demurred to the proposal of the British Government to recognize the Chinese Republic on condition that the Tibetan question was settled to its satisfaction first; for it ignored this condition and merely observed that recognition of the Republic by England would be of as much benefit to her as to China. It therefore persuaded the British Government to take the initiative in extending recognition to the Republic of China without entangling it with the Tibetan question.

Translation of Letter from the Wai Chiao Pu to Sir John Jordan?

(Forwarded January 10, 1913.)

Your Excellency,

On the 23rd December, 1912, in regard to the Tibetan question, a memorandum was sent to your Excellency for transmission to His British Majesty's Government.

The Chinese Government is very desirous that, regarding the Tibetan question, the British and Chinese Government should come to harmonious arrangement and avoid all misunderstanding.

It is hoped that Your Excellency will communicate to us at as early a date as possible what your Government has to say with regard to our reply, so that the Chinese Government shall be able to re-consider the question and a satisfactory solution may be reached.

We have the honour to make this necessary communication to Your Excellency and await your reply.

THE HUKUANG LINES

LOAN DIFFICULTY ARRANGED

The negotiations which were opened some time ago between the Minister of Communications and the Banks interested in the Hukuang Loan have reached a conclusion, and therefore money will soon be available for the commencement of work on the lines. The suspense connected with the negotiations for the big reorganisation loan had some effect in preventing the Hukuang question from being settled. Diffidence to advance the money was caused by the Revolution making the security doubtful and in pursuance of their desire for a revision of that aspect the Bankers touched on other points which the Minister for Communications could not see his way clear to concede. The money now, however, will be advanced, the Chinese agreeing to the appointment of auditors as employees of the Government. The line will be collateral security until the original security is deemed satisfactory. The money will be deposited in the foreign Banks until an arrangement is made with the designated Banks.

There were many rumors afloat with regard to the desire of the recently appointed Managing Director, General Hwang Hsing to retire, and his resignation has now been officially accepted. It is said that he felt that he should not be under the direction of the Board of Posts and Communications. Another report has it that he has effected a rapprochement with General Li Yuan-hung, and that the two are spoken of as the possible President and vice-President of the Republic. This may be taken for what it is worth. It is a pity, if it is true, that a little more time is not devoted to the practical things of the country, rather than to a constant flight after the bubble reputation.

SURVEY OF THE HUPEH-HUNAN TRUNK LINE

The survey of the northern section of the trunk line from Canton to Hankow, that in Hupeh and Hunan, is continuing as rapidly as is possible, according to latest reports. We are informed that the survey from Wuchang to Yochow, on the north-eastern extremity of the Tung-ting Lake, has been completed, the distance being some 160 miles, whilst parties are now pushing through between that point and Changsha, and between Lukow and Heng Chow-fu. Three parties are running preliminary surveys between Heng Chow-fu and Yichang-hsien, on the border of Kwangtung and Hunan, with the object of finding the easiest road through this difficult piece of country. Altogether ten survey parties are operating between Yochow and Yichang.

This line promises to be one of the most picturesque as a travelling route in China proper. The country is reported to be extremely picturesque, well wooded, and in addition is rich in minerals. There are magnificent gorges to be penetrated, especially in the Nanling Mountains, on the border, and in crossing this range the line will reach an altitude of from 1,200 to 1,300 feet, the highest on the route. There will be some very long bridges, and, unless a better route can be found than that originally surveyed on the Sinling Mountains, one of the longest tunnels in the world will have to be pierced. This, it is hoped, will be averted, and for that reason special attention is now being given to the surveys in the locality by three different parties.

Taking it all in all the line will be a heavy one to build, and presents numerous difficulties from an engineering point of view. For the first ten miles from Wuchang the country is flat. It then runs into the hills, gradually crosses the tea districts of Yang Lou-su and Yang Lou-tung, and goes on to Yochow. From Yochow the line will run as direct as possible to Changsha, and then to Chuchow at the junction of the Liang Shui River and the Siang River, which latter will be paralleled to an extent for a considerable distance.

From Changsha to Chuchow the line has already been constructed by a Chinese provincial company, the distance being about 35 miles. This will be merged in the main line. Chuchow is also the junction with the Pingsiang Colliery line. From there the main line will run south, past the sacred mountain of Hengshan, to Heng Chow-fu, from which city the valley of the Lei river will probably be followed, passing through the Nanling Mountains and connecting with the line in course of construction from Canton.

THE CHANGSHA-CHUCHOW LINE

The local company controlling the section of the line already constructed and operating between Changsha and Chuchow is holding out for an exorbitant price for the line, especially when its present condition is taken into consideration. The embankments in numerous places are in bad condition, and where the line parallels the river Siang erosion is constantly going on, with no attempt on the part of the operating company to take preventive measures or even repair the damage done. In the past, of course, concrete of a poor quality was used in places, but work in this direction ceased over a year ago.

The permanent way is likewise badly neglected, the sleepers rotting and ballasting being compelled to take care of itself. The price being asked is Tls 8,000,000 for 105 *li* of line, or about 35 miles.

At Changsha this line starts from the north gate station, skirts round the east wall, and reaches the river south of the city. It then parallels the bank for some distance, and is open to the effects of the water even at mean height. When the main line is under construction the route will, at this point, no doubt, be further removed from the river, or be built under different methods. The ballasting is of gravel, and the gauge standard.

On the line there are four or five bridges, none above 200 feet long, the ironwork, it is reported, being imported and erected by the Yangtsze Engineering Works of Hankow. There are five stations on the line, some of the buildings being substantial brick structures, whilst others are mere huts. Telephone and telegraphic connection exists between the stations, though one wire serves for both purposes.

The programme originally entertained for the erection of work shops and a round house were suspended some time ago owing to the progress made with arrangements for the commencement of work on the main line, but the walls of the round house are up, the location being at the Hsin-ho station at Changsha, where there is a turn-table built by the American Bridge Company. In the absence of shops of their own the Company has most of their repair work done at the shops of the Pinghsiang Colliery road.

The following is a list of the rolling stock of the road: Two Baldwin Mogul engines (eight wheels of which six are driving) with separate tenders; two Baldwin double enders (ten wheels, of which six are driving); two first class passenger cars and eight second class and third class passenger cars of German construction, and ten freight cars (box, gondola and flat cars) of British manufacture. The cars are fitted with automatic couplers, but are without air brakes, though the engines are fitted with them. Four other Baldwin locomotives and thirty cars were ordered from America for delivery last autumn, and an order was also on foot for Taels 43,000 worth of machinery for the proposed shops, but in view of the negotiations for the purchase of the road this latter order, at least, has, we understand, been held over.

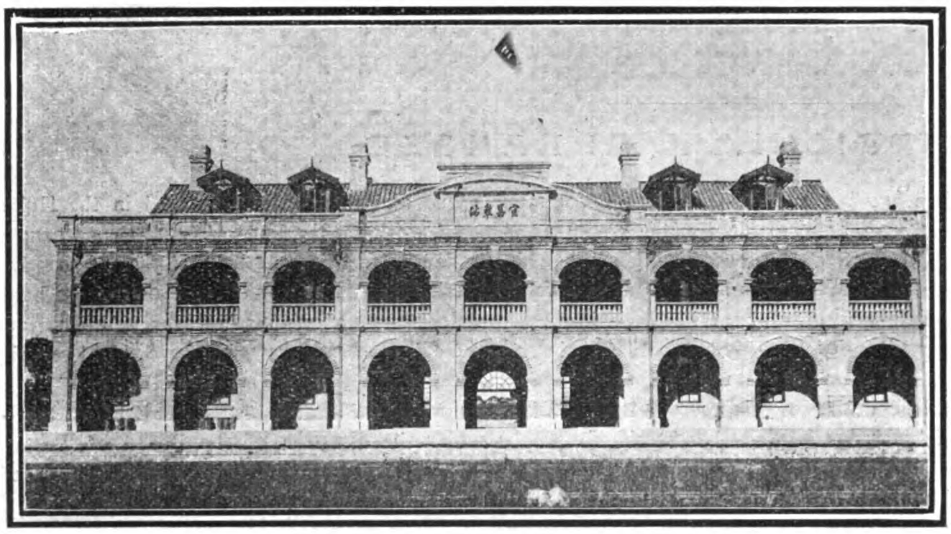
Like most other Chinese privately owned lines this one suffered sadly from financial anemia, the earning capacity being no more than about $200 Mexican per day of which all but $20 was for passenger fares. The line merely connects two river ports and traverses a sparsely populated country, with water competition for freight, and possessed no great earning power, and is not likely to possess any, until extended or connected up with the main line, or until connection with the Yangtsze is effected from Yochow.

It is stated that Taels 6,000,000 have been spent ostensibly on the railway, and running short of funds the company issued its own notes to facilitate their operations. Gladly enough shareholders welcome the chance to see a return of their capital from the Government purchase of the line, but the price at present being asked is so stupendous for what would be obtained that the Government are hesitating before closing any deal, though in the ultimate it will be essential for them to obtain and control the road. As in Szechuan this fact is realised and consequently the native Company is likely to hold out for the highest price that it can get.

THE SZECHUAN-HANKOW OR CHUAN-HAN LINE

But few railways have the distinction of having caused a revolution, but this is accorded by some to the projected line from Hankow to Chentu, via Ichang, Kweichowfu, Wanhsien and Chungking. Those who are fully informed know that the agitation that arose in Szechuan in consequence of the railway nationalization policy adopted at the instance of H.E. Sheng Kung-pao, simply provided the revolutionary organization with their opportunity, which was successfully seized. To say, however, that the revolution was caused by Sheng's policy or the conclusion of the Hukuang Loan Agreement, is to misread history. It is true, though, that the Chinese for over ten years have been bent upon building the Szechuan Railway themselves, and the desire to avoid recourse to foreign assistance led to the subscription of large sums of money, much of which, however, has been expended in directions from which no return can possibly come.

By Article II of the Hukuang Agreement the Loan was to provide capital, *inter alia*, for:—A Government railway main line from



SZECHUAN RAILWAY—STATION AT ICHANG

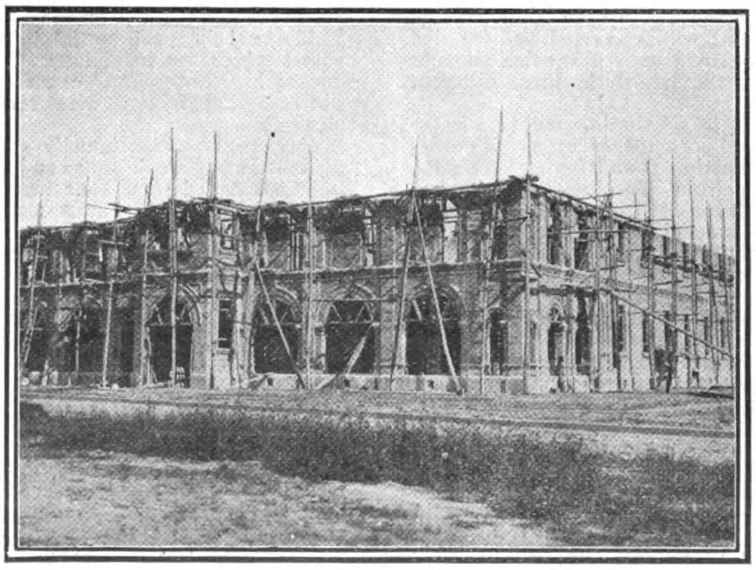
had been subscribed voluntarily, the greater proportion of the remainder having been collected as "tsu ku"—i.e., shares given in exchange for forced levy, payable by every landholder in the form of an addition to his land-tax. Though at the time of the meeting the first sod had not been turned and the company had been in existence some five years, the actual balance in hand was only Tls. 10,421,958 (say, £1,357,026). Among other grounds for dissatisfaction it was found that there were on the books 249 employees drawing some £8,500 a year in salaries and wages; the explanation afforded was most inadequate, and as a result certain of the directors and assistant-directors were handed over to the authorities to be dealt with on charges of malversation of the funds.

The company had been organized by H.E. Hsi Liang, then Viceroy of Szechuan, in 1904 in order to prevent a foreign loan being raised for the construction of the line. Shortly afterwards the services of two American students, Messrs. Hu and Luk, were secured to survey the line, but nothing came of the survey. The policy of the company was to defer work until sufficient funds were in hand to complete the section from Ichang to Kweichow,

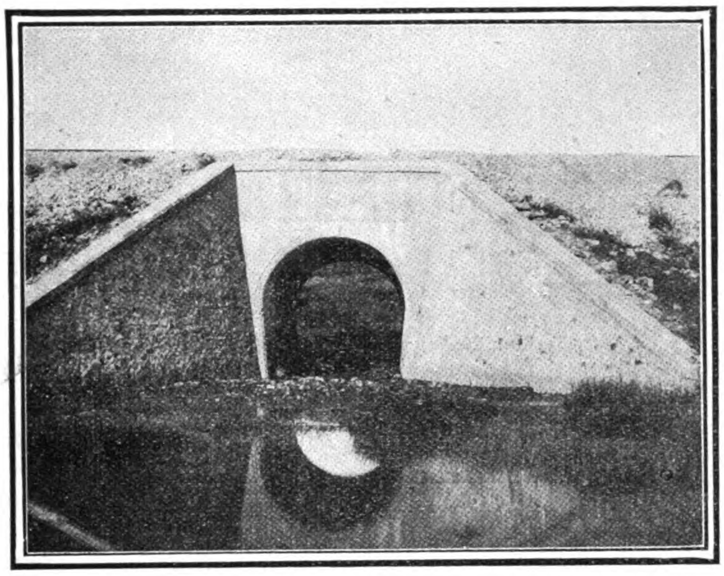
THE YANGTSZE AT ICHANG

a point at or near Kuangshui in the Province of Hupeh, connecting with the Peking-Hankow Railway line and passing through Hsiangyang, and Chingmenchow to Ichang, an estimated distance of 1,200 Chinese *li*, or 600 kilometres, and from Ichang to Kweichoufu in the Province of Szechuan, an estimated distance of 600 Chinese *li*, or 300 kilometres,—this latter section of the main line having been added in substitution for the branch line from Chingmenchow to Hanyang originally agreed upon, the total length of this main line, hereinafter known as "The Hupeh Section of the Szechuan-Hankow Railway line" being about 1,800 Chinese *li*, or 900 kilometres.

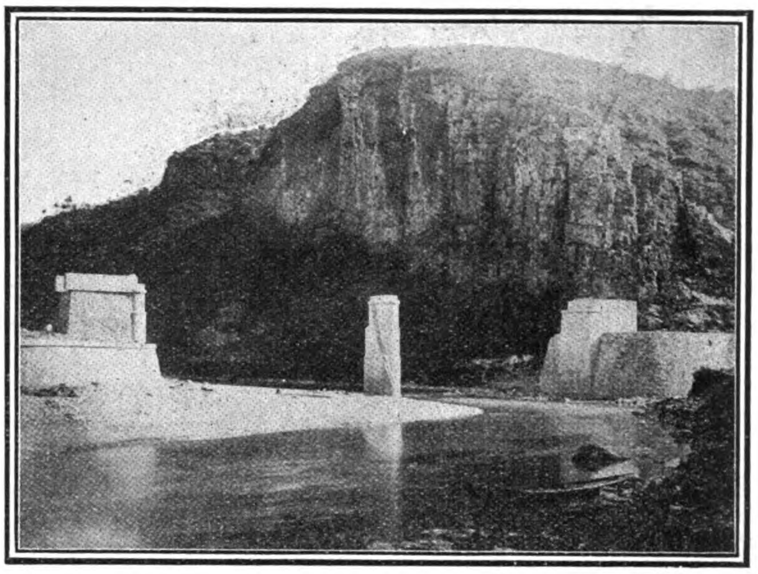
The agreement was signed in May, 1911. By Article III it became incumbent upon the Government to take over the lines already constructed in Hupeh and Hunan. This was resented by the Chinese shareholders, who showed their dissatisfaction in the usual way. It may be remarked in passing that the agitation against nationalization and foreign aid was the more extraordinary in view of the lamentable failure of the company to show results. At a meeting of shareholders held in November, 1909 the accounts submitted showed that a sum of Tls. 15,405,902 (say, £2,006,000) had been collected in shares, taxation, investments of capital, etc. Of this only 28 per cent.



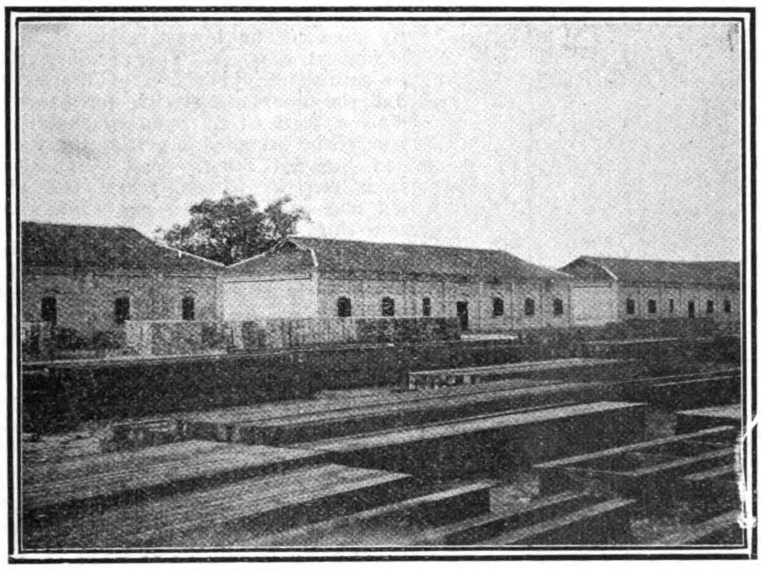
SZECHUAN RAILWAY—HEAD OFFICE AT ICHANG; UNDER CONSTRUCTION



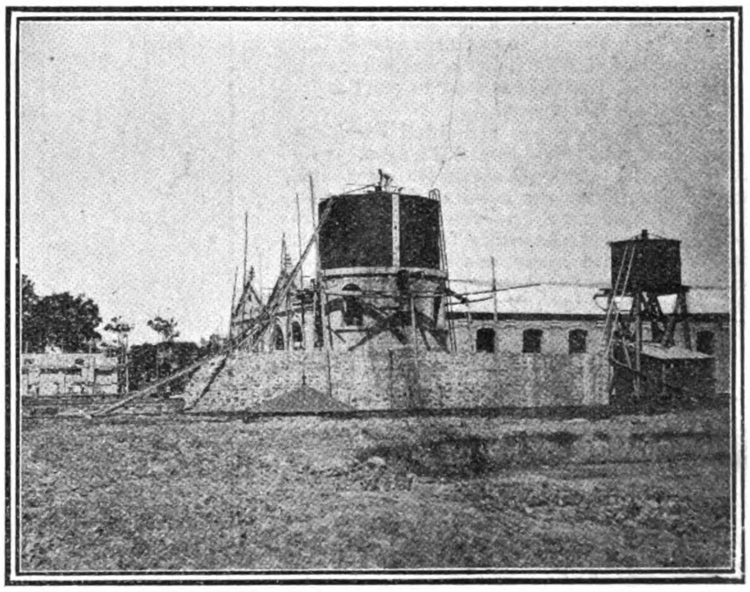
SZECHUAN RAILWAY—AN ARCH BRIDGE



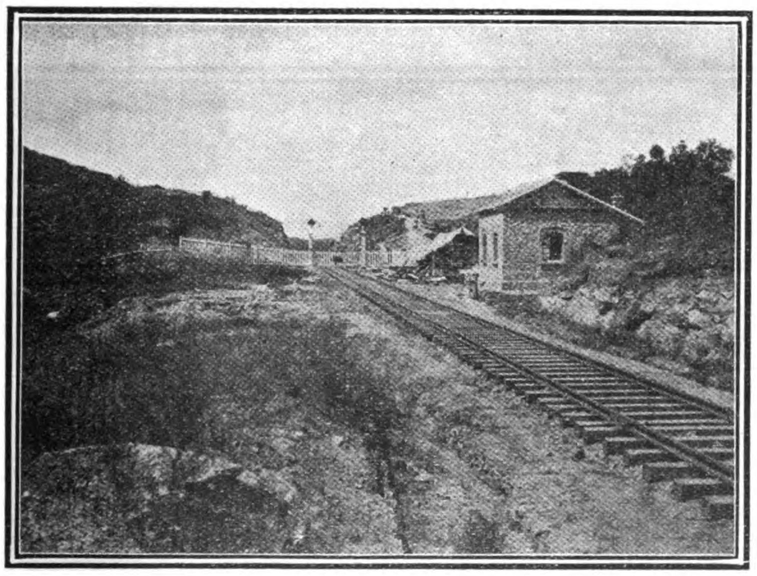
SZECHUAN RAILWAY—TWO 100 FEET SPAN BRIDGE AT ICHANG



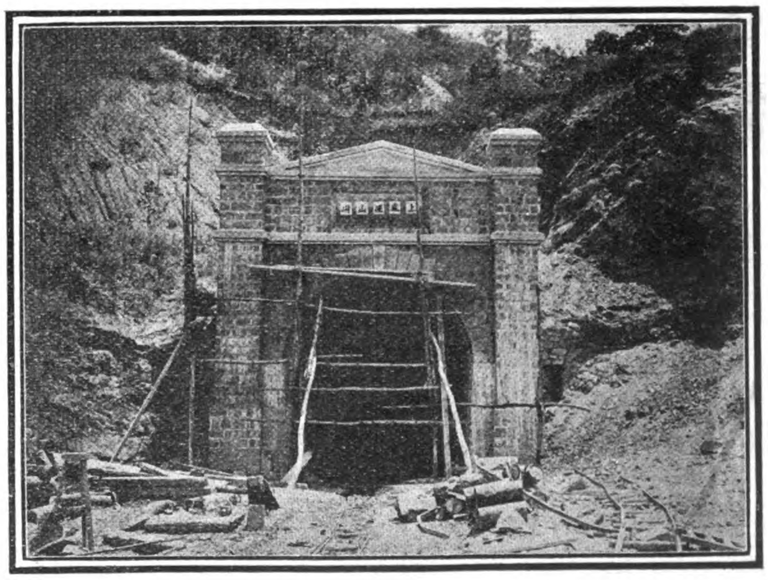
SZECHUAN RAILWAY—STOREROOMS AT ICHANG



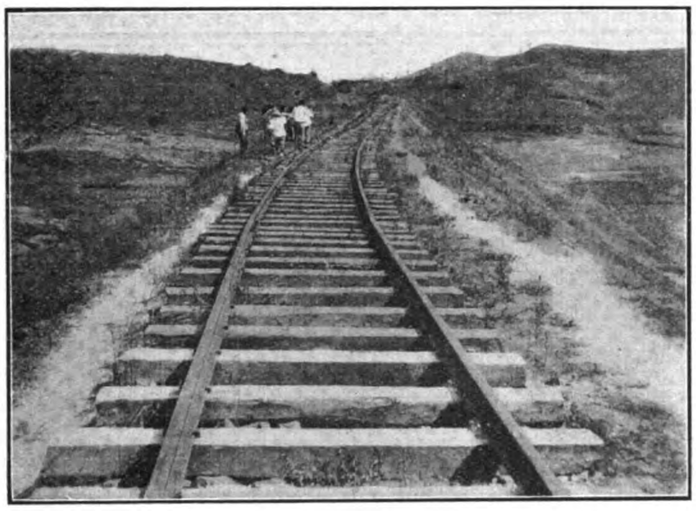
SZECHUAN RAILWAY—WATERTANK WITH ENGINE SHED IN REAR AT ICHANG



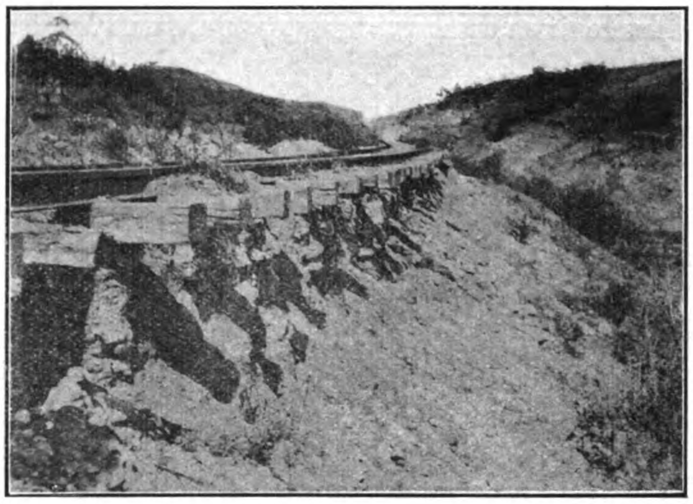
SZECHUAN RAILWAY—VIEW ALONG THE LINE



SZECHUAN RAILWAY—TUNNEL NO. 1; 800 FEET IN LENGTH



SZECHUAN RAILWAY—VIEW SHOWING THE GENERAL IRREGULARITY OF THE LINE, A NOTICEABLE FEATURE THROUGHOUT



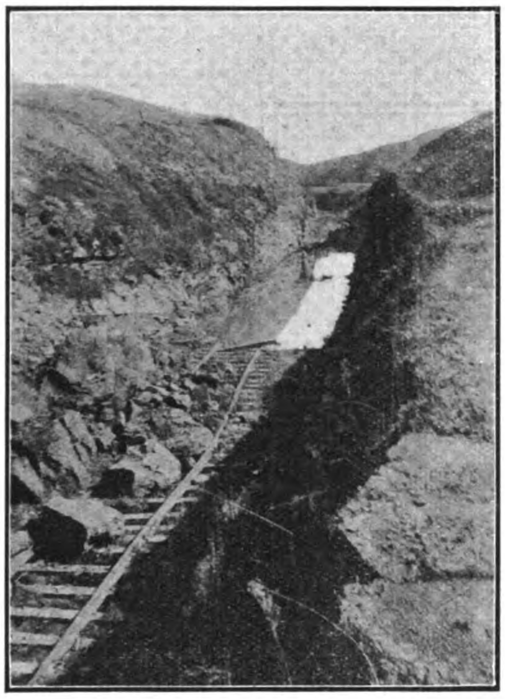
SZECHUAN RAILWAY—SHOWING HOW THE EMBANKMENTS HAVE GIVEN AWAY, AND THE CHARACTER OF THE SLEEPERS

a distance of about 100 miles. A great squabble arose about this time in regard to the question whether the Ichang-Wahnsien section or that between Chungking and Chengtu should be built first. An engineer named Mr. Li, an official of the Yuchuanfu, was borrowed, and he decided that it was best to start from Ichang towards Wahnsien.

Mr. Li Chih-shuen was appointed President of the line and Mr. Jeme Tien-yu, who constructed the Peking-Kalgan Railway, Engineer-in-Chief. As the latter could not be on the spot all the time Dr. Yen Te-ching was appointed Resident Assistant Chief Engineer. Two surveys were made, one inland and one along the Yangtsze and were compared with the object of selecting the most feasible route.

The first sod was turned by Mr. Li, the President of the Company on December 10, 1909 at Ichang, the occasion being made one of great rejoicing. Actual construction did not start until later, the first spike being driven at Ichang on July 21, 1910. The work was pushed ahead with rapidly during 1910. Early in the year 10,000 coolies were employed and by November 15,000 were at work. Up to the time the revolution broke out about 16 miles of railroad to Hsianchi had been laid, although preliminary work had been begun for 60 miles. At present the portion constructed is rapidly deteriorating as will been seen from one of the illustrations accompanying this article.

The administration offices and head station are outside the east gate of Ichang. From there the line goes north-west inland. This is necessitated by the mountainous character of the country. Some idea of the magnitude of



SZECHUAN RAILWAY. END OF PRESENT CONSTRUCTION, SHOWING SUBSIDED EMBANKMENT AND FLOODED CUTTING BEYOND

the undertaking can be gained when it is mentioned that there is fifteen miles of tunnelling through solid rock between Ichang and Wanhsien. Beyond the town of Hsiangchi there is a succession of precipitous mountains and lofty passes. The lowest is 800 ft. high and the highest 4,000 ft. Thence along the Yangtsze until the neighborhood of Wanhsien is reached, the mountains stretch down to the river like the teeth of a comb. Calculations of the time to be occupied in getting the track completed between Ichang and Wanhsien, vary from ten to fifteen years, and the estimated cost is Tls. 38,500 per Chinese *li* (about one-third of a mile.)

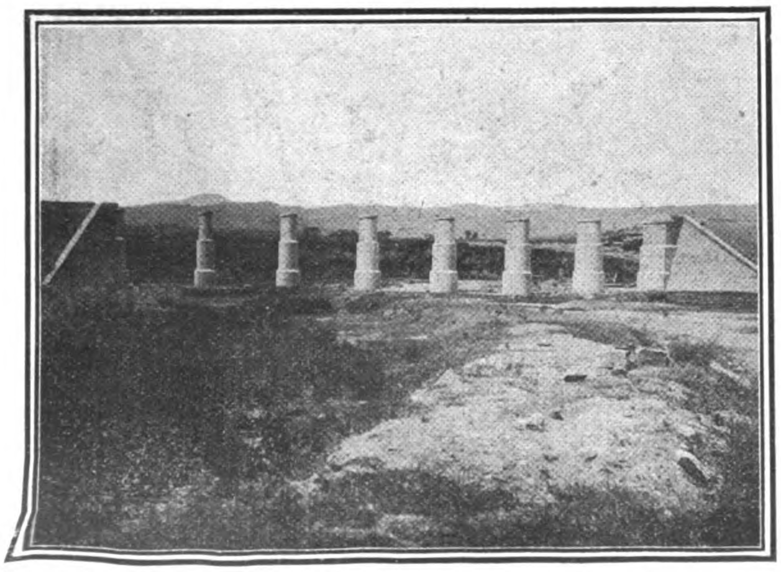
Two tunnels have been completed, one 800 feet long and the other 200 feet, while eight others were fairly under way when work was stopped. These include two, twenty-five miles from Ichang, each of about 1,000 feet. The longest tunnel is 6,200 feet long and is about fifty miles from Ichang.

Work was started on this tunnel in November 1910 with five shafts and a distance of 1,500 feet had been driven when the famous Imperial Edict which caused the cessation of the work, was issued.

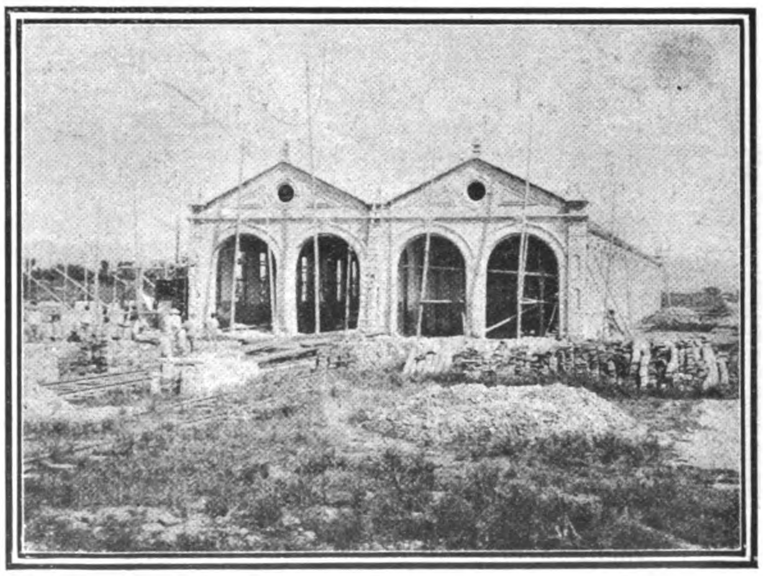
The ruling grade of the line is one in 40, which is very good for such country. The rails are of 85-lb. weight, 13 sleepers to the rail.

The actual work accomplished and begun on the Ichang-Kweichoufu section may be summarized as follows:—

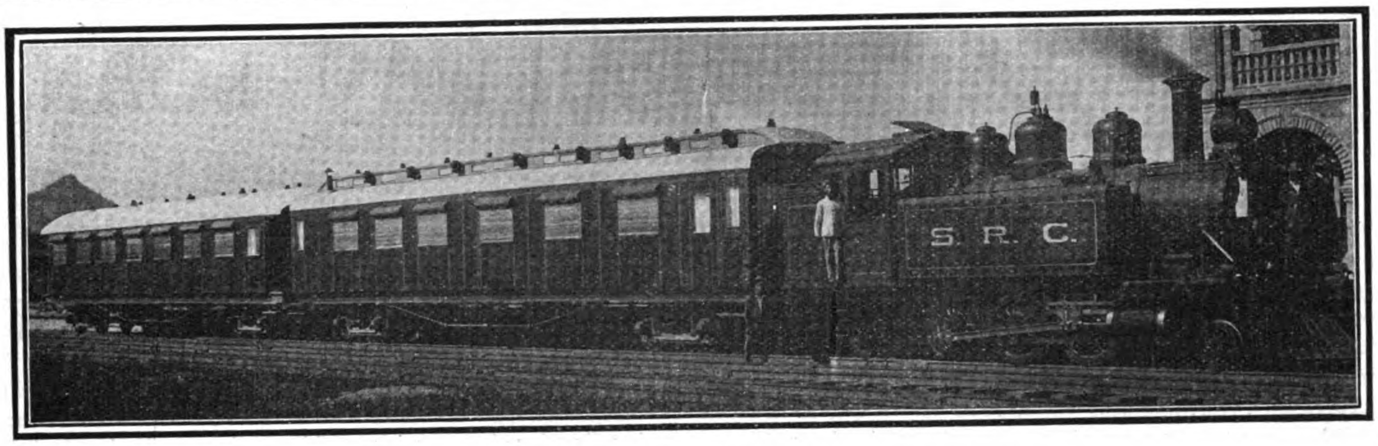
Bunding wharf finished.
Three goods godowns erected.
Earth works at wharf and station finished.
Double track laid from wharf to station.



SZECHUAN RAILWAY—SEVEN SPAN BRIDGE NEAR ICHANG



SZECHUAN RAILWAY—LOCOMOTIVE SHEDS



SZECHUAN RAILWAY COMPANY LOCOMOTIVE AND CARS

Ichang station finished.

Four stations along line finished.

Two engine sheds for 12 locomotives finished.

Water tower finished.

Machine shops finished.

Head Administration office finished.

Store Department and staff quarters finished.

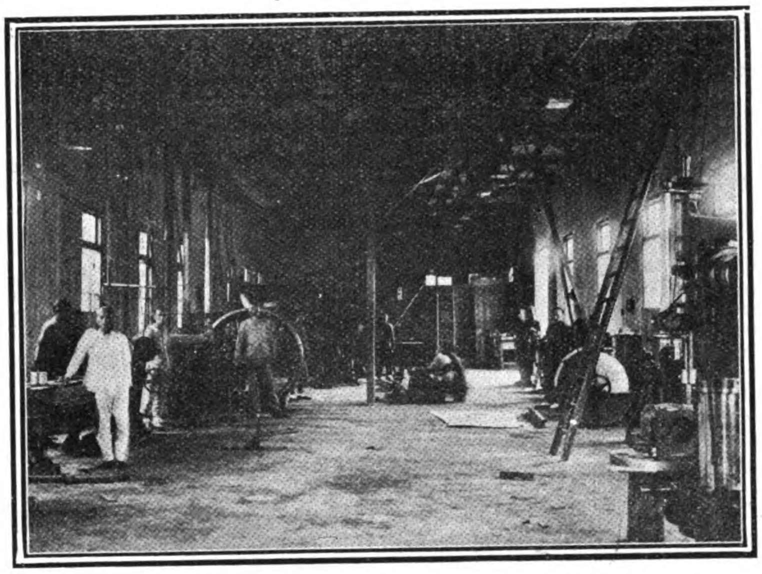
Courses of creeks changed.

Numerous stone retaining walls finished.

Over fifty bridges finished.

Over sixty bridges started.

It may be mentioned that the machine shope are electrically driven and are fitted with American machinery. About 100 bridges were bought from the American Bridge Company. A good many orders for this line, however, went to British manufacturers.



SZECHUAN RAILWAY—TEMPORARY WORKSHOP AT ICHANG

ROLLING STOCK.

3 Baldwin shunting engines.

1 first class private car.

2 2nd class passenger cars.

4 3rd class passenger cars.

50 high side freight cars.

30 steel ballast cars (German)

20 flat cars (German).

The passenger cars were bought from the Government Railways of North China.

It was reported in November that it had been arranged that the Central Government should build the railway and that they should repay Tls. 10,000,000 to the Szechuan people, Tls. 200,000 to be paid when the work of construction is restarted early this year.

THE SALT GABELLE

REGULATIONS REGARDING AUDIT

The Government has issued regulations governing the reorganization of the Salt Gabelle. It would appear that these regulations were issued without any reference to the bankers, and that they are not deemed satisfactory by the Diplomatic Corps. Admiral Tsai Ting-kan has been appointed Inspector-General of the Gabelle and Mr. J. F. Oiesen has accepted the post of vice-Director.

The new regulations are as follow:—

I.—GENERAL.

1.—The present regulations govern the receipts and payments for the Salt Gabelle of China, the amount of salt consumed, the salt offices outside Peking, and their branches.

2.—On account of the importance of salt affairs and the complicated nature of salt accounts, the Ministry of Finance has established a Department of Audit and Report of the Salt Gabelle, in the Ministry, and its branches in the provinces, in order that the Salt accounts may be properly audited. Foreigners will also be engaged to assist the department.

II.—NUMBER OF OFFICIALS.

3.—There shall be a Director appointed by the Minister of Finance, a vice-Director, who should be a foreigner employed by the Minister, and a number of auditors, who shall not exceed ten in number.

4.—In the provinces, the branch department shall have one Chinese Director and one foreign vice-Director, and the rest of the employes shall, according to the circumstances, be fixed by the department with the approval of the Bureau of the Salt Gabelle, and the Minister of Finance.

III.—THE AUTHORITY.

5.—The said Department shall be under the control of the Bureau of the Salt Gabelle, and the branches in the provinces under the said department, and the Chief of the Bureau of the Salt Gabelle shall have authority over them all.

6.—The affairs of the said department shall be audited by the Bureau of the Salt Gabelle, and the branches in the provinces by the said department. But all shall be done under the supervision of the Ministry of Finance.

7.—The production, transportation and other administrative affairs in connection with the Salt Gabelle are not under the control of the said department and its branches in the provinces. But the salt certificates, which are in connection with the receipts, shall not be considered valid unless signed or sealed by the officers of the said department or its branches.

IV.—THE DUTIES.

8.—With regard to the receipts of the salt revenue, the branch offices are responsible for their safe-keeping, and they shall be from time to time remitted to the Government treasury, with a report to the Salt Commissioner and the said department for auditing purposes. With regard to payments they shall be submitted by the Chief of the Salt Gabelle to the said department, which after signing the documents will re-submit them to the Minister of Finance for investigation.

9.—At the beginning of a new year the branches in the provinces shall draw up an estimate with detailed explanations and send it through the Salt Commissioner to the Ministry of Finance for investigation, and accounts shall also be reported in the same manner.

10.—Besides the above estimates and accounts, a similar method of rendering accounts shall be copied from the Customs Service, i.e., every three months, returns shall be rendered to the Salt Commissioner at the nearest place and to the said department, for investigation.

11.—The forms used in recording the estimates, accounts, etc., for the branches shall be fixed by the said department, submitted to the Chief of the Salt Gabelle and the Minister of Finance, for approval, and then be sent to the branches for printing, etc.

12.—The estimates, accounts, etc., received from the provinces shall be summarised by the said department who will then submit the same to the Minister of Finance for investigation.

13.—If the said department or its provincial branches should desire to make any investigation in the accounts, the Chief of the Salt Gabelle or the Chief of the Salt Department may be consulted, whether the books be investigated or a delegate be sent.

V.—OBSERVATION

14.—These Regulations shall take effect from the date of promulgation.

THE BELGIAN RAILWAY LOAN

FULL TEXT OF THE AGREEMENT

A loan agreement was recently signed for the extension of the Kaifong-Honan line, but so far no certainty exists that the work will be carried on as at first contemplated. This line, with its extension to Lanchow, the capital of Kansu and the eventual march westwards to the Russian frontiers is the most important line in China, and it is inconceivable that its control by a practically unknown group of financiers will be permitted without a protest from the nations who have large interests in the country. Already murmurings are in the air, and it is not unlikely that desires to have a revision of the agreement will shortly take definite shape. The money market of the world is so sensitive to the touch of certain hands, that difficulty may be experienced in floating the loan, and the probability is that, unless the syndicate now in control is able to defy the covetous, a rearrangement will be come to. So far the Chinese Government has appointed a Director General, and it is understood that he is making preparations to commence the survey. There is also a difficulty in that direction, for opposition to his appointment is already being raised, though not upon sound grounds. The opponents have a nominee of their own, and for that reason they feel justified in advocating the removal of Mr. S. C. Sze, who now holds the post.

The following is a translation of the agreement:—

Preamble

The "Compagnie Générale de Chemins de Fer et de Tramways en Chine," concluded with the Chinese Government in the 29th Year of the Emperor Kouang-su, corresponding to the year 1903 of the occidental calendar, a loan contract for the construction of a railway from Kaifong to Honan-fu in the Province of Honan.

Article 23 of the contract stipulated:

"If the Company of the Railways and Tramways in China finishes, in good condition, the work of the railway from Kaifong-fu to Honan-fu, strictly in accordance with all the clauses of the present contract, in this case and if the Chinese Government decides to extend the railway from Honan-fu to Sian-fu, the Director General of the Imperial Chinese Railways obligates himself to agree to a preference and to give an option for the loan required for the enterprise to the Company, conformably to the clauses and conditions of the present contract.

It is well understood that if the Chinese Government is able to provide the necessary capital for the construction of the extension from its own resources or with funds raised by the subscription of its own nationals, the Company may not benefit by this Article."

The Chinese Government, having decided without further delay upon the construction of a principal transversal line of which the Pienlo and Lotung railways form the central sections, recognizing that the Company has completed in good condition the construction of the railway from Kaifong-fu to Honan-fu, taking into consideration that certain clauses of the aforementioned contract of 1903 offer serious difficulties, notably the clause admitting the foreign companies to a participation in the benefits,

Desiring to unify in the best possible way the construction, the equipment and the operation of the proposed great transversal line, namely by the incorporation of the aforementioned contract of 1903 into a new contract:—

Has concluded with the General Company the present contract which has for its object the connection by rail of the city of Lanchow-fu with the sea, passing through Sian Fu, Tun Kwan, Honan-fu, Kaifong-fu, Koreite-fu, Suchow-fu, and the Government receives to itself all the rights and advantages arising from the development of this line in its entirety, although at the same time it grants to the General Company certain compensation for the abandonment of its rights previously required.

Articles I.—Contracting Parties.

This contract was made at Peking, September 24, 1912. (First Year of the Chinese Republic).

The contracting parties are:—

Monsieur the Minister of Communications, duly authorized, by the Presidential Order dated August 21, to negotiate in the name of the Government of the Chinese Republic of the first part, and "La Compagnie Générale de Chemins de Fer et le Tramways en Chine," domiciled at Brussels, represented by Mr. Robert de Vos, duly authorized, hereafter called "The Company," of the second part.

Article II.—The Amount of the Loan

The Chinese Government authorizes the Company to issue a five per cent gold loan of two hundred and fifty million francs.

Article III.—Date and Name of the Loan

The loan will bear the date of the issue of the bonds: it will be called "Emprunt du Governement de la Republique Chinois" (Loan of the Government of the Chinese Republic) five per cent. gold, of 191.. (1912 or 1913, first or second year of the Chinese Republic) for the Railway of Lung-Tsing-U-Hai.

Article IV.—Object of the Loan

This loan is made exclusively to provide the necessary funds for the following purposes:—

1. The construction and equipment of a principal line which will connect Lanchow-fu, the capital of Kansuh, in the West, to a seaport to the North of the Yangtsze River, in the East, making use of the Pienlo and Lotung sections, and eventually the Tsing-Kiang-Pu railway branch, and passing through Sian-fu, the capital of Shensi, Tun Kwan, Honan-fu, Kaifong-fu, the capital of Honan, Kweite-fu and Suchow-fu, province of Kiangsu. The definite survey and the eastern terminus will be decided jointly by the Director General representing the Chinese Government and by the Company, who will be guided in their selection by the interests of the enterprise. It is understood that the construction of the equipment includes the purchase of the necessary property and of material, rolling stock and other, as well as the work of joining together the existing sections in such a way as to insure an early and fruitful operation of the whole line.

2. *Pienlo Section*

The redemption of the 41 million franc loan on the Kaifong-fu-Honan-fu (Pienlo) railway of November 12, 1903.

As soon as the redemption has been made the Kaifong-fu-Honan-fu (Pienlo) contracts will be cancelled and the Pienlo line, forming a section of the principal Lung-Tsing-U-Hai line, will be operated and managed in accordance with the clauses of the present contract.

The interests of the bondholders refusing to redeem their bonds and interest at 5% will be protected by a deposit in a foreign bank named by the Company of a sufficient amount deducted from the amount of the present loan in order to insure the payment of the coupons to July 1, 1915, and the redemption of the principal on that date.

In compensation to the Company for the abandonment of certain rights which it possesses by nature of the contract of 1903 as far as administration and control are concerned, especially the 5% of the profits of the operation of the Pienlo Railway, the Chinese Government agrees to include in the present contract the extension of the Pienlo Railway East to a seaport. The Company renounces the 20% of the profits of the Tungsi Section to which it was entitled by virtue of Article 23 of the contract of 1903: it gives up also the special rights of administration and control accorded it by the contract.

In exchange for this renunciation the Chinese Government includes in this contract the construction of the extension of the Tungsi line West to Lanchow-fu, province of Kansuh.

Lotung Section

The Chinese Government obligates itself to purchase, equip and put into operation the Lotung section, granted to the provincial company of Honan, so that the Company may at an opportune time take all necessary steps in order to prosecute without delay and hindrances the work outlined in this contract to the West.

The Tsing-Kiang-Pu Branch Line

This branch of about 20 kilometres to the old bed of the Yellow River belongs to the Chinese Government which agrees that if the line from Suchow-fu to the terminus is so run so that this branch will be included it may be used by the contractors subject to the approval of the Engineer-in-Chief.

The cost of this undertaking will be taken from the amount of the loan.

3. To the management of the terminus port.

4. To the payment of the intercalary interests due on the loan as well as the operation expenses during the period of construction, the time of which is estimated at 5 years reckoned from the beginning of the date of the completion of the preliminary studies.

Article V.—Interest

The interest on the loan will be at the rate of 5% per annum upon the par value and it will be paid semi-annually by the Government of China to the bondholders: it will be calculated from the date on which the loan will be placed on the market and paid under the conditions hereinafter stated.

Article VI.—The Life of the Loan and Repayment

The life of the loan will be forty years. The repayment of the capital will commence ten years after the issue of the loan to the public.

Under the reserve of the right of repayment before maturity as provided for hereinafter the repayment will be paid in annual amounts in accordance with the tables of amortization annexed to the present contract.

The amounts necessary for the annual amortization will be paid to the Company in equal semi-annual payments, under conditions hereinafter stated.

After ten years from the date of the loan the Chinese Government will have the right to redeem in whole or in part the amount of the loan not yet redeemed by paying a premium of 2½% upon the par value of the bonds, in case of redemption before the 17th year of those bonds which by virtue of the table annexed to this contract the redemption would not be obligatory. Each time the Chinese Government wishes to make an extraordinary redemption, it must give six months previous notice in writing to the Company.

The extraordinary redemptions will be made by supplementary drawings (lottery) which will take place at the same time as the ordinary drawings, in accordance with the provision of the prospectus of the loan.

The redeemed bonds and interest coupons will be received and cancelled by the Company when they shall have been presented for payment: the Company will transmit them in good order to the Minister of China accredited to the countries where the payment has been made.

The Company will pay to the Chinese Government the total amount of every bond or interest coupon which shall not have been presented for payment in thirty years from the date on which they were redeemable or payable.

When the loan shall have been wholly redeemed the present contract becomes immediately null and void.

Article VII.—Service of the Loan

The Chinese Government undertakes for the present, the formal engagement and without reserve of paying fully and exactly the interest and to repay the capital of the loan conformably with the table annexed to the present contract. During the construction the interest will be paid from the funds realized from the proceeds of the loan.

The Chinese Government will raise the funds necessary for the service of the interest after the completion of construction and for the repayments from the receipts of the railroad: in case of insufficiency from the general revenues and at their default from the surplus not utilized in accordance with Article XIII.

The receipts of the railway shall be deposited promptly in a bank designated by common consent of the Chinese Government and the Company. This bank will deduct from these deposits for conversion into gold in the best interests of the Chinese Government the total amount necessary for the service of the loan for the two following semi-annual payments. This conversion will be made in such a way as to insure a supply of gold necessary for the service at least fourteen days before the day of maturity.

The half yearly payments due for interest and reimbursements will be deposited by the Company fourteen days before the day of maturity fixed by virtue of the preceding paragraph.

These deposits will be made by the Minister of Communications in the Banks designated by the Company in "sycee" used in the port where the payment takes place or in National Money (when it will be in circulation) and should be of a sufficient sum total to convert these payments into gold in Europe.

Exchange

The exchange for these payments will be fixed with the Company and the Banks designated by it the same day the deposit in silver is made.

Nevertheless, the Chinese Government will have the power to fix the exchange rate for the whole amount within the six months preceding the date on which the payment should be effected.

If in the future, a Bank of the State of China establishes a branch in Europe and not simply a correspondent or foreign agent, this Bank of the State will share to the amount of 50% of the service of the transfer of the funds with the banks designated by the Company.

Expenses-Charges

To cover the expenses occasioned by the payment of the interest and reimbursement of the principal of the loan the Company will receive from the Chinese Government a commission of a quarter per cent. on the payments.

Guarantees

The payment of the interest and repayment of the capital of the present loan are guaranteed by the Chinese Government and by a special guarantee on the Lung-Tsing-U-Hai Railroad.

This special guarantee constitutes a first lien on the Road itself, the permanent way, the rolling stock, the out houses and the products. It is accepted by the Company in the name of the bondholders.

If the Chinese Government is in default for the payment on the date fixed for all or a part of the semi-annual interest and repayment the Company will have full powers to exercise all the rights of action which accrue to it from the special guarantee.

Article VIII.—Price of the Loan

The price paid by the Company to the Chinese Government for the bonds will be the price of issue to the public on the Brussels Exchange less six per cent. of their nominal value.

The Company will defray the expenses incident to the issue and sale of this loan, such as "syndicat de garentie," commission and brokerage, cost of telegrams, and of correspondence, printing and engraving of the prospectus and of the bonds, stamp duty and taxes. The Director General or the Ministers of China in the country where the issue will have taken place, will be advised beforehand of the price of the issue of the loan.

Article IX.—Issue

The Company is authorized to issue immediately Gold Bonds representing the total amount of the loan. Until issue the bonds will be deposited in banks designated by common agreement.

The Company is authorized to withdraw the bonds from the bank depositories with a view to the delivery to the subscribers in due time, conformably to the prospectus of the loan.

The nominal amount of the bonds will be fixed by the Company, which may make the bonds of different values.

The Company will fix the form of the bonds, the language in which they will be drawn up and the money in which their value will be expressed, conformably to the usage of the country in which the issues will be made. They will notify in advance the Director General or the Minister of China in the countries where issued.

The bonds will bear the fac-simile signature and the official seal of the Director General in order to dispense with the original signature.

Before the issue of the bonds, the Ministers of China accredited to the countries where the issues are made will affix to each document their official seal and the fac-simile of their signatures as a proof that the issue and the sale of these bonds are authorized by the Chinese Government and made in its name and for its account.

These bonds will be countersigned by the agent of the Company in the country where the issue takes place.

All the details necessary for the prospectus, or relating to the interest and to the redemption of the capital of the loan which may not be explicitly fixed by the present loan will be regulated by the Company after having consulted the Ministers of China accredited in the countries where the issue will be made.

The Company is authorized to publish the prospectus of the loan as soon as possible after the signing of the present contract.

The Chinese Government will give instructions to its representatives accredited to the conntries where the issue will be made, for them to sign the Prospectus of the loan and for them to give their assistance to the Company in all questions which may arise.

This loan of two hundred and fifty million francs will be issued to the public in one or in several issues, as soon as possible after the signature of the present contract. The first series of one hundred million francs or less will be issued to the public within twelve months from the date of the signing of the present contract. The rate of issue of the subsequent series which will not be less than fifty million francs, will be fixed by common arrangement by the Company and the Chinese Government in such a way that the work on the material foreseen by the present contract will suffer no delay.

The subscription list will be opened by the Company in Europe and in China in accordance with the following conditions: preference will be given to the subscription of the Chinese Government on the condition that this subscription list may be turned over to the Company at least four days before the publication of the prospectus.

The Company will notify the Chinese Government seven days before the publication of the Prospectus.

If before the publication of the Prospectus for the issue of the loan, a political or financial crisis takes place which would effect the market and the price of Chinese securities already floated to the point of making impossible in the judgment of the two contracting parties, the issue of the present loan, the Company will be granted a reasonable delay for the execution of the present contract.

If the loan has not been issued during the delay the length of which will be fixed by common agreement, the present contract will become null

and void. In this case, the advances which may have been made by the Company by virtue of this contract will be repaid immediately by the Chinese Government with current interest but without any other compensation or remuneration whatsoever.

ARTICLE X.—LOST BONDS.

If any of the bonds issued for the present loan are lost or stolen, the Company will so notify the Minister of Communications as well as the Minister of China accredited to the country where these bonds have been issued.

The latter will authorize the Company to publish notice in the papers that payment on these lost or stolen bonds has been stopped, and to take all measures which may be necessary in the premises in accordance with the laws and customs of the country.

If a bond has been destroyed, or if the bond lost, or stolen has not been found within the time fixed by the Company, the Minister of China accredited to this country shall affix his seal to a duplicate bond, of the same nominal value, and shall deliver it to the Company in its capacity as representative of the lost, stolen or destroyed document. The Company will defray all the expenses on behalf of the owner of the instrument.

ARTICLE XI.—EXEMPTION FROM TAXATION.

All the debts, all the coupons, and all the payments made or received in connection with the service of the present loan shall be free from all impositions and taxes on the part of the Chinese Government during the period of the loan.

ARTICLE XII.—THE TRUSTEE COMPANY

The Company shall be able to act as Trustee for the holders of the third part (les porteurs des tiers) of the present loan.

It will have the power to represent them and it will have the power, likewise, to act in their name in all the negotiations which shall become necessary with the Chinese Government or in any discussion concerning the present loan.

ARTICLE XIII.—PAYMENT OF THE PROCEEDS OF THE LOAN, LIABILITY OF THE RAILWAY

The proceeds of the loan shall be paid to the credit of an account known as "The Lung-Tsing-U-Hai Railway," which shall be opened by the Company or by the Banks designated by it, in Europe (Gold Account in Europe).

The proceeds of the loan shall be placed to the credit of this account in successive payments, in conformity with the conditions accorded to the subscribers to the loan.

The Company shall be responsible for these places of deposit. The credit balance of this account shall bear interest payable to the Chinese Government. The rate of interest shall be three per cent. per annum.

After deducting the payments and the reserves that must be made with respect to the proceeds of the loan, in conformity with the present contract, the Company shall hold the credit balance, plus the current interest, at the disposition of the Director General.

A sufficient sum shall be left in Europe for all payments for materials and the salaries of the staff.

The Director General shall have the power to transfer to China, at his will, the loan funds after having come to a previous understanding with the Company on the subject.

Not more than three millions of francs may be thus transferred in any one week without the consent of the Company.

These transfers shall be made through the Company and the banks designated by it and their total amount shall be deposited to the credit of the Lung-Tsing-U-Hai Railway (Gold Account in China) at the liability of the Company.

In conformity with a table of estimates drawn up by the Engineer-in-Chief of the expenses to be met in China during the month of......or the following months, the Director General shall determine the total amount necessary to be set aside from the gold account for conversion into Chinese silver.

This conversion shall be made by the Director General and through the banks designated by the Company. It may not be for more than the sums required for one month unless the Company or the Banks designated by it consent thereto.

The proceeds of the conversion shall be deposited in current account to the credit of the Lung-Tsing-U-Hai Railway (Silver Account in China) in the banks designated by mutual agreement:—they shall bear interest at the rate fixed by rules in force for this category of current accounts.

All drafts on the banks designated as depositories of the funds of the Lung-Tsing-U-Hai Railway in China shall be signed by the Director General and the Engineer-in-Chief conjointly.

The amount of these drafts shall be handed to an agent designated by the ;Director General against a receipt given by the agent and at the responsibility of the Director General. This agent shall not yield up these funds except on a requisition signed conjointly by the Director General nd the Engineer -in-Chief.

The Director General and the Engineer-in-Chief shall have absolute control over all the expenditures and receipts of the railway.

During the period of the loan the accounts of the railway shall be kept in Chinese and in French according to modern methods.

The Railways Administration shall publish annually, after the closing of its fiscal year (la cloture de son exercise), a report in Chinese and in French, showing the receipts and expenditures connected with the management of the railway and the public shall have access to this report on request.

ARTICLE XIV.-EVENTUAL DEFICITS AND SURPLUSES

If the proceeds of this loan increased by the interest thereon are not sufficient for the finishing and equipment of the railway, the deficiency will be made up in the following manner:

In the first place the funds which the Chinese Government may have at its disposal will be used in such a manner as to permit the continuation without interruption of the work of construction, the funds thus used will be considered as being a part of the capital of the railway, but the dividends to which the capital thus furnished shall be entitled shall in no wise impair the guarantee which insures the payment of the interest and the principal of the capital forming the subject of the present loan.

If, after this, funds are lacking the Company shall issue a new series of the loan, subject to the conditions of the present contract, for the amount necessary to entirely complete the line and put it into definite operation.

This new series shall enjoy the same guarantees and will be placed, in all respects, on the same footing as the former series of the present loan amounting to 250,000,000 francs.

If, after the completion of the railway, there remains to the credit of the account of the Lung-Tsing-U-Hai railway, a surplus of funds not utilized, this surplus shall be placed in a bank in China that shall be designated jointly by the Director General and the Company.

This surplus shall constitute a reserve for the payments for which the Chinese Government shall be liable by reason of the present contract.

ARTICLE XV.—ADVANCES.

If, in order the accelerate the carrying out of the present contract, the Chinese Government and the Company find that funds are necessary in advance of the issuance of the loan the Company undertake to make the necessary advance at the rate of six per cent. interest per annum. In this case the Company will be empowered to withdraw from the bank in which they are deposited Bonds to an amount equal to one and half times the sum advanced.

These advances will constitute first charges, for their principal and interest, on the proceeds of the loan.

ARTICLE XVI.—CONSTRUCTION

The preliminary investigations for the construction of the line will be commenced within the shortest possible time.

The length of the line will be definitely fixed after these preliminary investigations are concluded.

Work on the railway will be commenced within six months after the signing of this contract. It is estimated that this work will continue for the space of five years after the conclusion of the investigations.

The Chinese Government shall name the Director General of the Railway. This officer will have his permanent residence within the immediate neighborhood of the work of construction. He shall have full power to act on behalf and on account of the Chinese Government within the limits of this contract. The Engineer-in-Chief will be subject to his orders. The emoluments of the Director General will be fixed by the Chinese Government acting with the Company and will be a charge upon the railway.

In a general way and without prejudice to the engagements entered into by virtue of Art. IV pars. 9 and 10 the Chinese Government will provide freely and without encumbrance all the land needed for the construction of the railway and its attached works. It will, therefore, take all measures and will assume the making of all payments and the defraying of all charges whatsoever necessary to assure the passage of the line through public property (governmental or provincial) or private property, in the villages and cities as well as in the country. All the sums required for this purpose and those required for the purposes named in Art. IV. pars. 9 and 10 by the Chinese Government will be placed in the hands of the Government and will be deducted from the proceeds of the loan. However the entire amount to be paid to the Chinese Government under this heading shall be fixed by the Director General and the Company.

The work of constructing the railway will be performed under the supreme direction of the Director General.

The Director General and the Company shall act together and conscientiously choose an Engineer-in-Chief who shall be either Belgian or French, experienced and honest.

The Engineer-in-Chief will conclude the making of the studies, plans, tracings and estimates of the line, will direct the execution of the work thereon, and will have charge of the materials, tools, and the property necessary for the regular prosecution of the work. All these operations, must, however, be submitted in the first place to the Director General for his approval.

The Director General will fix the salary of the Engineer after having come to an agreement with the Company.

The Engineer-in-Chief will draw up a table of organization of the European staff necessary for the construction and will submit it to the Director General for his approbation. This force comprising the Chief of Service, the Chief of Section, the Chief of the Accounting Bureau, etc., shall be engaged by the Company which shall place it under the orders of the Engineer-in-Chief.

In all that concerns the Chinese staff, technical or other, the Director General shall have full power of appointment: he will place it under the orders of the Engineer-in-Chief. No Chinese employe or European can engage without the assent of the Director General.

It is well understood that Chinese subjects having made special studies or having acquired sufficient practical knowledge may be recommended by the Director General to the Chief Engineer who will employ them by the same titles as European employees, but it will be necessary to send them previously to the Chief Engineer accompanied by a technical delegate who will examine their capabilities.

The Director General can revoke appointments for a gross fault in the non technical personnel: in that which concerns the technical personnel and all the European personnel the Director General may demand the recall from the Chief Engineer who shall acquiesce in this demand if the indicated motive is sufficiently recognized.

The European personnel should have in a general manner the greatest regard for the Director General and his special representatives. They should respect the local authorities and not interfere in the affairs of the country. They should equally respect the Chinese habits and customs, in order to live with a good understanding with the inhabitants.

The intention of the contracting parties in inserting the preceding stipulations is to safeguard the prestige of the Director General and assure the regular prosecution of the work.

The Director General reserves to himself, also the right, in agreement with the Company, to delegate for the works one or more special representatives carrying full power. The salary of these representatives to be paid by the Railway.

Supplies

The Company will be charged during all the time of construction with the supplying of everything necessary for the construction and equipment of the line, and for the needs of its operation except Chinese supplies which can be procured on conditions of equal price and quality.

The Company will apply for competition in order to obtain the most advantageous conditions notably those relating to quality and price, but preference will be given to Belgian and French supplies.

These orders for contracts for work should be issued by the Chief Engineer and submitted for the approval of the Director General. The accounts of moneys paid for supplies of material and expenses of every nature paid in Europe should be sent every three months with a statement of accounts and supporting vouchers to the Director General for approval.

Exemption from Taxes

All orders made by the Company in China as well as those abroad will be exempt from all right of taxation, import, and likin on the entry or on their passage through Chinese territory. Nevertheless this stipulation does not impair the right of the Chinese Government eventually to impose on these orders such future taxes as shall be paid on orders destined for the construction and equipment of all other railways of the countries whatsoever.

Expenses

The Company will not have to meet any expense relative to the "construction de ses deniers" but it is well understood that the Director General will pay the Bureau at Brussels only that which concerns the expenses necessary for study, orders, receipts of materials and engaging of personnel. These expenses can be fixed by common agreement at a lump sum payable annually to the Company. Consequently the expenses of representation of the administration, indemnities and others will remain in charge of the Company.

Small Branch Lines

The present contract will apply if the Company will consent to the construction of small branches from the Lung-Tsing-U-Hai Line that will be necessary in order to assure traffic and establish useful relations.

ARTICLE XVII.—WORKING DURING CONSTRUCTION

In proportion to the completion of the different sections of the line the Director General and the Chief Engineer will take, by mutual agreement, the necessary measures in view of their operation.

Future Extension.

If, in the future, the Chinese Government considers it desirable to construct extensions of the Lung-Tsing-U-Hai Railway to better serve the interests of the country, notably to prolong the line to Suchow, via Kan-cheou, Province of Kansuh, it engages itself to extend the preference with the Company and give it the option on the relative loans for these enterprises on the same conditions as those which will be offered by other banks or foreign societies without this stipulation weakening the right of the Chinese Government to execute these works of extension by means of funds raised from Chinese sources.

ARTICLE XIX.—FINAL OPERATION

Personnel and Control

The Chinese Government will be in sole charge of the operation and of the direction of the railway.

It will designate for it the Director General who will be assisted by the Engineer-in-Chief.

The Engineer-in-Chief will be under the orders of the Director General. The Director General and the Company will select conscientiously and by common accord the Engineer-in-Chief who will be of Belgian or French nationality, experienced and honest.

For the dismissal of the Engineer-in-Chief a previous understanding must have been reached by the Director General and the Company.

The Chief of General Accounts, who will be of Belgian or French nationality, will fill at the same time (du bon Emploi) the position of Auditor. He will be named by the Director General and confirmed by the Company. He will sign jointly with the representative of the Director General all the checks drawn and responsible documents of all kinds.

Each time that it becomes necessary to appoint technical employees for the railway, or to define their functions or even to remove them, the Director General must consult with the Engineer-in-Chief and act in accord with him. In case of disagreement between the Engineer-in-Chief and the Director General the difference will be submitted to the Minister of Communications who as the last resort will decide the question.

Supplies

From the beginning of the operation of the entire line the Director General will place orders for the supplies according to the best interests of the enterprise, but conditions of price and quality being equal, preference will be given to Belgian and French firms. In the case where it is a question of making one or more foreign firms agents to purchase supplies for the operation of the line, the Company, under equal conditions, will have the preference for one-third.

ARTICLE XX.—RIGHT OF DELEGATION, SUBSTITUTION AND TRANSFER

The Company may designate one or more banks in China or elsewhere to execute in its stead and place all or a part of the financial obligations with which it is charged by virtue of this contract.

The Company, shall have the rights, under reserve, of all the engagements it has undertaken by this contract, of transferring or delegating all or a part of its rights, powers or advantages, to another Company or group or to agents or administrators, with power of substitution in whole or in part.

It is well understood that the Companies or group having been delegated or substituted by application of the preceding paragraph must be of Belgian Nationality and that these transfers of rights will be subject to the approval of the Minister of Communications.

ARTICLE XXI.—ARBITRATION

In case of differences between the Company or its delegates and the Director General on the subject of the execution of the contract, the conflicts or differences will be settled by the decision of two arbitrators, one chosen by the Chinese Government and the other by the Company. In case of disagreement, the two arbitrators will name a third arbitrator whose decision shall be final.

ARTICLE XXII.—EXECUTORY FORMS

The present contract signed and sealed by the Minister of Communications and of Finance, shall be approved and sealed by the President of the Republic and ratified by the National Assembly, after which, and without delay, the Wai Chiao Pu will officially notify the Minister of Belgium at Peking.

This contract is executed in four copies each in French and Chinese. Two copies will be deposited with the Government of the Chinese Republic and two with the Company. In case of doubt or difference concerning the interpretation of the present contract, the French text will prevail.

Peking, the 24th day of September, 1912. (Year 1 of the Chinese Republic.)

L.S. THE MINISTER OF COMMUNICATIONS.

L.S. THE MINISTER OF FINANCE.

L.S. FOR LA COMPAGNIE GÉNÉRALE DE CHEMINS DE FER ET DE TRAMWAYS EN CHINE.

THE LOTUNG RAILWAY

HONANFU AND TUNGKUAN

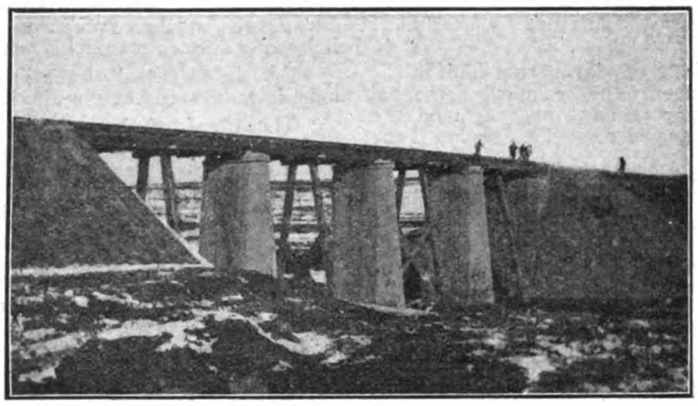
It was early recognised that it was of the greatest importance that the Pienlo Railway should be extended from Honanfu to Tungkuan, and subsequently to Sianfu. Objection was taken to the provision of foreign capital and eventually the Honan-Tungkuan Railway Company took up the work of construction. In 1909 there were reports that the American Group, represented by Mr. Willard Straight, was going to finance the line, but the Chinese decided to find the funds themselves. The unfortunate result of the work being hampered by financial difficulties, which has, in the past so often attended purely Chinese undertakings, was also the fate of this enterprise.

The capital subscribed was frittered away without any tangible outcome in the shape of a railway. A loan of Tls. 5,000,000 from the Kungyi Bank was mooted and an agreement was actually signed, but the net result of operations so far has been that seventy miles of earthwork has been completed and rails laid for thirty miles.

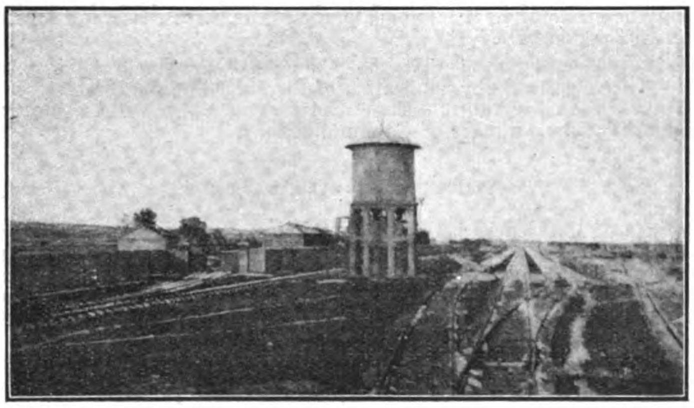
The length of the railway when completed will be 160 miles. The standard gauge has been adopted. There is a prospect of a very fair carrying trade in local products, and, of course, when the line is extended to Sianfu and ultimately to Lanchowfu, the Lotung Railway will greatly benefit. The Government, designs to buy up this line in order to pledge the whole length of railway named in the Belgian Loan Agreement, as security for the loan.

The Executive Board of the Railway is as follows:—

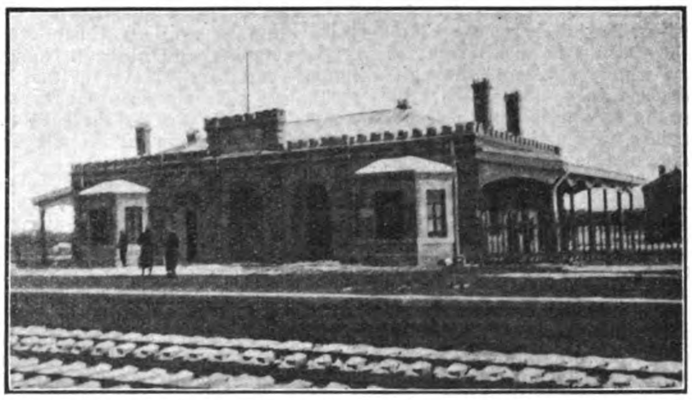
President, LIU KUE
Vice-President, PENG YUN-PING
Consulting Engineer, JEME TIEN-YU
Chief Engineer, HSU WEN-CHOUNG
District Engineer, CHAO CHING
Assistant Engineers, LIU CHING, SHEN PEI-CHIA
Secretary, HSU YUNG-KWONG.



LOTUNG RAILWAY—TRESTLE BRIDGE NEAR HONANFU



LOTUNG RAILWAY—RAILWAY YARDS AT HONANFU



LOTUNG RAILWAY—HONANFU STATION

THE PIENLO RAILWAY

KAIFENGFU AND HONANFU

This line connects the important city of Kaifengfu, in Honan, and Honanfu and there links up with the Lotung Railway between Honanfu and Tungkuan. Some particulars in regard to the latter line are given in the preceding article. The Pienlo Railway was opened to traffic in 1908. It is 115 miles in length, but is really only one link in a comprehensive scheme to connect Kansu and the sea-board. The Pienlo is owned by the Chinese Government, but the administration is in the hands of French officials representing the Belgian Group. The contract for the construction of this line was signed in Shanghai, 1904, between H E. Sheng Kung-pao, the director general of the Imperial Chinese Railways, and Mr. Armand Rouffart, the representative of the Cie General de Chemins de Fer et de Tramways en Chine. The line was financed by the Belgian Group which has now arranged to finance the construction of the railway uniting Lanchowfu and Haichowfu, the Chinese Government borrowing 25,000,000 francs, or £1,000,000 sterling at 5 per cent.

The new Belgian Loan Agreement contemplates, in the first instance, a railway 1,700 Kilometres in length, uniting Lanchowfu, the capital of Kansu and Haichow, the proposed new port in Kansu. The fact that the Pienlo Railway is under Belgian influence and that the original concession gave the option of prolonging the line from Honanfu to Sianfu rendered it almost inevitable that the Belgian Group would secure the construction of the great East and West line of which the Pienlo Railway, as already stated, forms a link.

The standard gauge, 4 ft. 8½ inches, has been adopted. The track is single and its condition is described as good. The section between Kaifengfu and Chenchowfu, where a junction is made with the Peking-Hankow Railway is fairly level and there were few cuttings. On the other hand considerable embankment was necessary to raise the roadbed above the surrounding country and to protect it from floods. West of Chenchowfu the loess hills are entered and thence to Honanfu there is a succession of cuttings and tunnels. Of the latter there are eleven between Szechui, a large market town not far from the Yellow River, and Heishikwan, some of them being 2,000 feet in length. While on the Kaifengfu-Chenchowfu section there is a danger of the road being entirely washed away in the event of the Yellow River dyke giving way, on the Chenchowfu-Kaifengfu section there is only a possibility of washouts in times of excessive rain.

In the 115 miles of line there are 403 bridges, 168 of metal and the remainder of masonry. The longest bridge is 300 metres. A steel girder bridge about 1,500 feet in length spans the Lo-ho, an important tributary of the Hoang-ho.

The stations along this line are of an unpretentious character, being one-storeyed semi-foreign buildings.

The commercial possibilities of the line are good as it taps the western section of Honan, which is rich and productive, but the line will not reach anything like its full earning power until the completion of the extensions east and west. Honan coal is used on the line, which is obtained from mines along the Taokow-Chinghua Railway.

ROLLING STOCK

Locomotives: 10 compound and 5 small engines of Belgian make.
Passenger cars: 29.
Freight cars: 307.

AGRICULTURE IN WESTERN CHOSEN

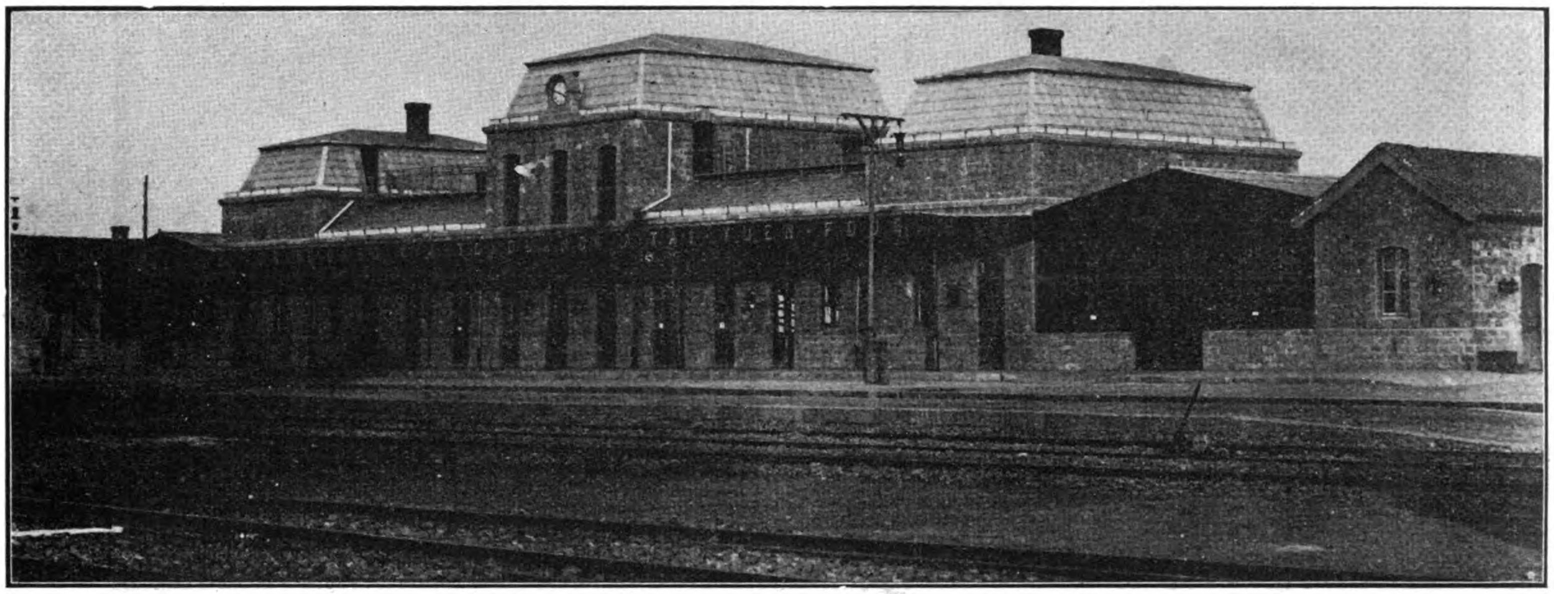
ACTIVITY OF ORIENTAL DEVELOPMENT COMPANY

A Chinnampo paper reports that the Oriental Development Company has purchased dry fields to the extent of 2,400 *chobu* in Taichon District, North Pyongan Province. Since last year the Company has directed its attention to agriculture in Western provinces and has been making investigations with a view to getting suitable lands. The recently purchased fields, it is stated, are to be converted into paddy farms, and official permission having been obtained, work will shortly be commenced at an estimated cost of 330,000 yen. In addition to these fields, cultivated lands to the total extent of over 1,000 *chobu* have been bought by the Company near Pyongyang. Further purchases are to be made, but the Chinnampo paper we quote adds that these purchases will be effected gradually lest they may causes a speculative rise in the price of lands.

The fields acquired by the above company, says the *Seoul Press*, are intended for leasing to tenants who can become proprietors after the lapse of a stated time on certain conditions and its activity in West Chosen as well as in Southern provinces will not in the least hinder the achievement of the agricultural policy of the Government-General as is apparently feared by some foreign critics. In other words, the company does not make these purchases for cornering or other speculative objects. Far from that, its principal object consists in improving hitherto more or less neglected arable lands in Chosen by the aid of irrigation and other expensive works and then apportioning them out to diligent and qualified farmers at moderate profits. It is to be hoped that the activity of the company will thus help the increase of peasant-proprietors as desired by Count Terauchi in his recent instructions to provincial Governors!

THE SHANSI OR CHENGTAI RAILWAY

CHENGTINGFU TO TAIYUANFU



SHANSI RAILWAY—STATION AT CHEU KIA TCHOUANG

On October 13, 1902 (14th day, 9th moon, 28th year of Kuang Su) the Director General of Railways, acting for the Chinese Government, signed a contract with the Russo-Chinese Bank for the construction of a railway between Cheng-Ting-Fu (a prefecture of Che-Li Province) and T'ai-Yuan-Fu (the capital of the Province of Shansi). Prior to this an agreement had been made between Fang, superintendent of the Lui-lin-Taiyuan Railway Co. (understood to be acting under authority of the Governor of Shansi) and M. Pokotilow, director of the Russo-Chinese Bank, for the construction of this line. The line including "official profits" was estimated to cost Tls. 6,800,000. The agreement provided that the company should borrow that amount from the Bank at 6 per cent. The contract of October, 1902 was signed by H.E. Sheng Hsuan-huai, acting under authority of an Imperial Decree, and Mr. C. R. Wehrung, one of the directors of the Bank. The amount of the loan was forty million francs and the rate of interest five per cent. It was provided that the Bank would endeavor to finish the work within a term of three years. Article V of the contract provided for the interdiction for 30 years, or while the loan was unredeemed, of the construction of another railway between Lui-lin and Taiyuanfu, that would be detrimental to the interests of the line.

The Russo-Chinese Bank transferred this concession to the "Société Française de Construction et d'Exploitation de Chemins de Fer en Chine," and in 1903 engineers were sent to China to build the first section.

The Engineer-in-Chief remained in Shanghai and arranged a preliminary draft contract, in which the gauge was not specified. The negotiations were lengthy because the Chinese Government desired to adopt the standard gauge, but as four-fifths of the line traversed mountainous districts and the remainder was a very tortuous route the French Society could not undertake to build a standard gauge at the proposed price of forty million francs.

The cost of building the line to standard gauge was estimated at 75 to 80 millions, and the earnings for many years would be inadequate to pay the interest on such a large sum.

The construction of a metre gauge line would necessitate a much less sum, and satisfy all the requirements of traffic over a period of 60 to 80 years.

So, finally, at the end of 1903, the Chinese Government accepted the metre gauge, and on July, 1904, the work commenced on the surveyed section up to kilometre 32, and the laying of the track was pushed forward with great activity.

Sketch of the Line

The preliminary reconnaisance was made before 1902, by engineers from a large construction firm of Paris. The starting point was about one hundred metres from the banks of the river Hou-Ta-Ho, at Louo-Liau, a village on the line of the Peking-Hankow Railway.

As the Hou-Ta-Ho often rises and causes great damage by floods, it was decided to start from Cheu-Kia-Tchoung a small village near the station named Kin-Han (abbreviation of Peking-Hankow) situated 15 kilometre to the south of Cheng-Ting-Fu and 277 kilometre from Peking.

The line proceeds westwards up to Cheo-Lang-Hien, kilometre 160, and then inclines towards the south, descending south-west to Tu-Tzeu-Hien (217 kilometre) and from there, north-west to T'ai Yuan-Fu, 243 kilometre.

From Cheu-Kia-Tchouang as far as kilometre 16, the line rises by easy gradients to the plain of Houe-Lou-Hien, arriving at the foot of the T'eou-Ts'iuen mountain (24 kilometre).

From this point it ascends to kilometre 30, with a grade of 18 to 19 millimetres per metre. From there, the line descends with an incline of 12 millimetres per metre for two kilometre so as to ascend and arrive at the first range of mountains, which it traverses through a tunnel of 150 metres to kilometre 34.

From kilometre 40 the grade is from 12 millimetres, crossing the Chin-Ho, (a tributary of Mien-Chouei) over a bridge of two trusses of 50 metres each. Finally, it joins the right bank of the Mien-Chouei and follows the conflux of the Hsi-Han-Ho and Mien Chouei, to where it crosses the branches of the Hsi Han River over two bridges of 50 and 60 metres.

Between these bridges it was necessary to place a metal truss of 10 metres, to allow the flood water to run from the two branches, and provide a road for the caravans and carts.

At Nan-Houng-K'eon (kilometre 47) the line leaves the right bank of the Min-Ho and continues towards Tsing-Hing-Hien kilometre 56. This section of the line is very difficult, rising in terraces with a grade of 18 to 21%, and crossing the neck by cuttings of 10 metres deep and 650 metres long, all of which could have been avoided had the inhabitants permitted the right of way by the valley.

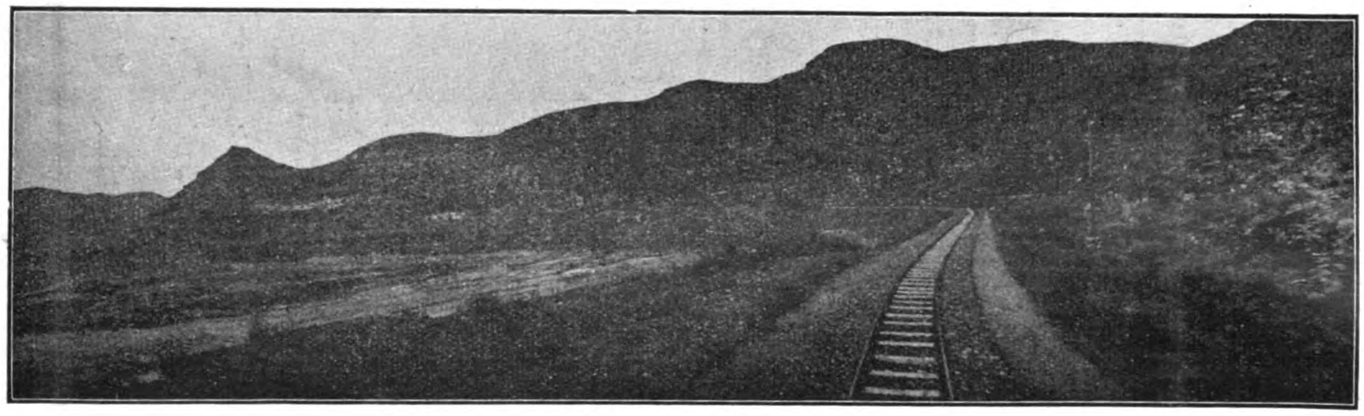
From kilometre 56 to kilometre 61 the line runs along the right bank of the river and passes over to the left bank by a metal bridge of 75 metres and then enters a curved tunnel 165 metres in length. From kilometre 74, the line again passes over to the right bank by a viaduct of 250 metres, comprising 3 trusses of 50 metres each, with arches of about 10 metres each, and 6 arches more of 10 metres. This point, the conflux of the two great rivers, is dry part of the year, but becomes active during the rainy season. One of the rivers—the Siao-Pe-Ho—takes its source from the north-west, near Ying-Ying. A survey was made from this point to Ping Y'an, but abandoned owing to the heavy grades and other engineering difficulties to be overcome. This valley is rich in anthracite and iron, and the Chinese work a large number of mines and furnaces here. Therefore to avoid the valley of Siao-Pei-Ho, the line follows the right bank of the Mien-Chouei, the other conflux of the river, a very difficult passage. By a series of tunnels, walls, and viaducts with a grade of 12 to 17%, the line ascends the banks of the river, which at this point have an elevation of 60 to 100 metres.

Between kilometre 75 and 90 the line follows the right bank. Here the mountain is pierced by a tunnel of 300 metres in length and the river is crossed by a bridge of 75 metres, together with a viaduct of 10 metres.

The Railway remains on this bank to kilometre 118, and crosses the river again by a metal bridge of 65 metres and two arches of two metres. One thus arrives at the center of the line (kilometre 121) near the point where it borders the Siao-Pei-Ho, and at kilometre 5 of the Sub-prefecture of Ping-Ting Chow the center of the anthracite mining district.

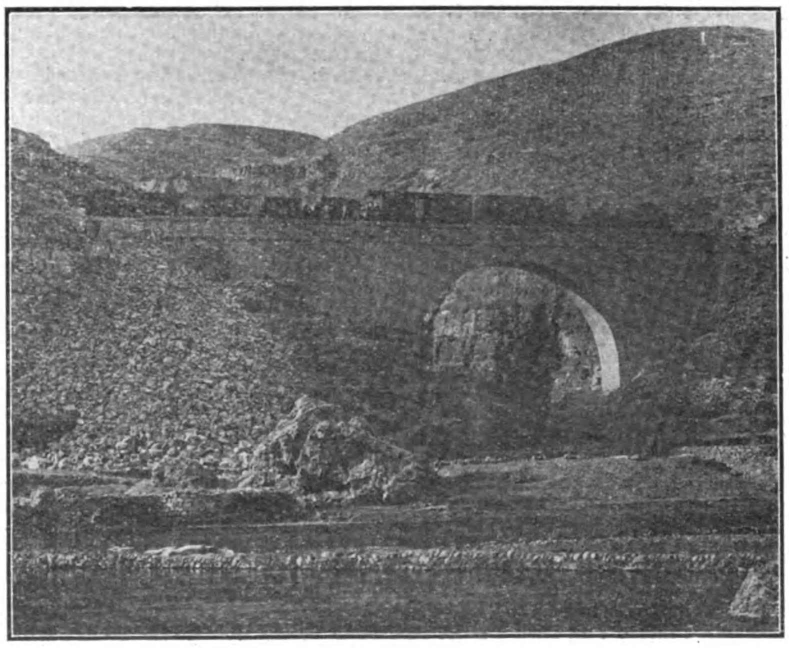
From kilometre 121 the railway is supported on the side of the right bank to kilometre 151, where the river is abandoned to enter a second valley, and arrives at the beginning of a neck (km. 155) of which the elevation is 1,076 metres, whence the line descends the terraces of loess over two or three easy grades to kilometre 231. From there two short sections

SHANSI RAILWAY—THE LINE SKIRTING THE RIVER

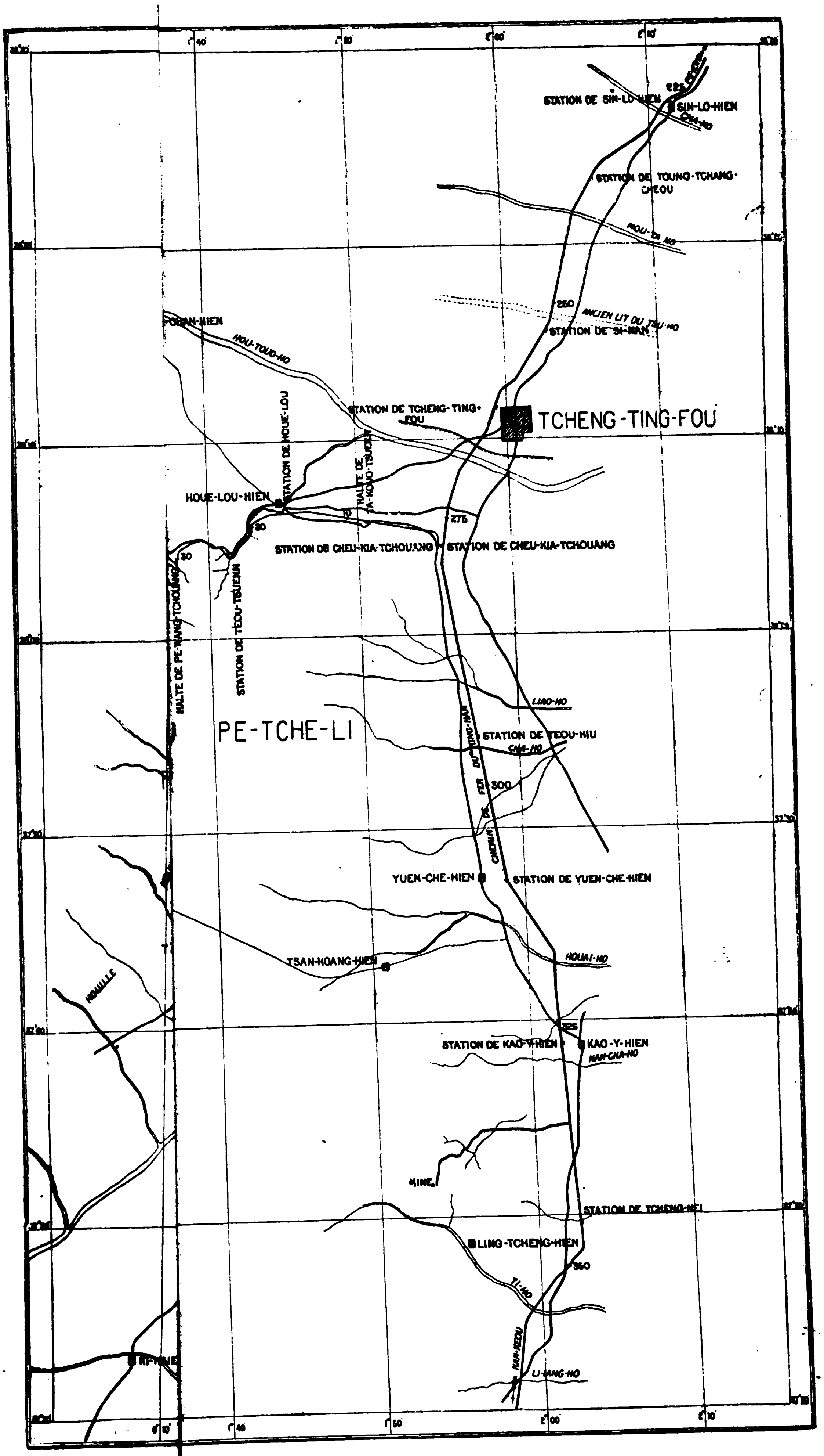


SHANSI RAILWAY—CHARACTER OF THE COUNTRY TRAVERSED

SHANSI RAILWAY—THE KM. 170 TUNNEL NEAR KOUO TSUENN



SHANSI RAILWAY—20 METRE ARCHWAY AT KM. 70



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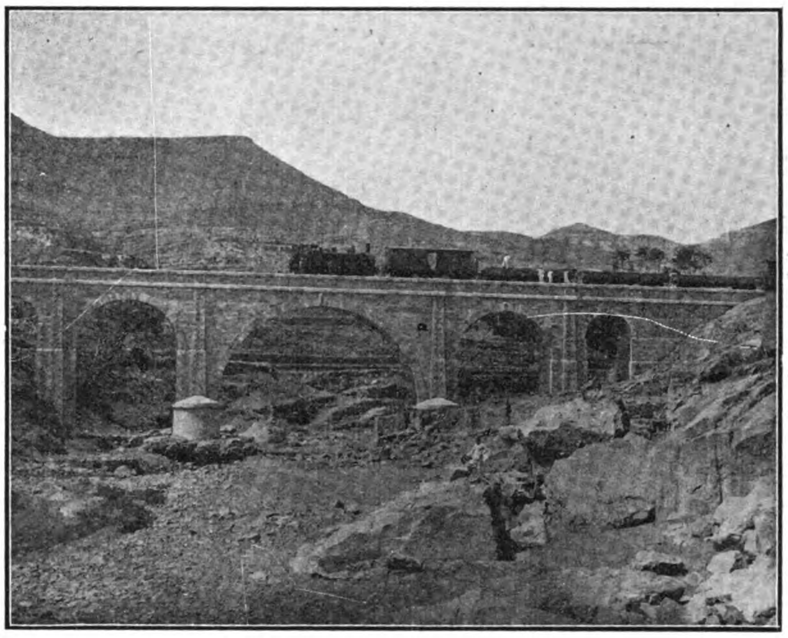
SHANSI

of the mountain, with grades of 12% are passed to kilometre 236, and thence to T'ai-Yuan-Fu, (kilometre 243) the elevation being 800 metres.

The section between Cheou-Tang-Hien station (kilometre 160) and kilometre 200 is a very narrow winding pass, in which the villages and lands are poor and the crops hardly sufficient to maintain the inhabitants. Seventy-five per cent. of the farms have been abandoned and ruined since the famine of 1901. The opium smoking habit also contributes largely to the misery of the region. Notwithstanding this, this route was chosen for the line on account of its lesser grades.

The study made to the north of Cheou-Tang-Hien, passing through the valley of Ping-Teou and the neck of the Nan-Tchouang, includes grades and curves of 25 millimetres and tunnels of 150 to 500 metres, entirely in the loess. It is regrettable that these cannot be avoided as this valley is very rich in agriculture, is prosperous, and the railway would be near the coal pits of Cheou Tang-Hien and of T'ai- Yuan-Fu.

To sum up, the Shansi line is made of heavy grades. From kilometre 24 to kilometre 160, there are grades of 17% maximum, and from kilometre 160 to kilometre 243, the curves and grades are not more than 12%. It would appear as though the railway could be constructed in a normal way, if the grades were the only obstacle, but the curves of 100 to 150 metres radius could not be reduced without enormous expense, whereas in general, the curves of 100 metres radius are at points where it was necessary to make trusses from 8 to 10 metres high, and to augment the curves tunnels of great length had to be pierced.



SHANSI RAILWAY—THE BRIDGE AT KM. 144. THIS BRIDGE IS 105 METRES LONG AND 26 METRES HIGH

The approximate cost of a metre gauge line to unite T'ai Yuan-Fu and Cheu-kia-Tchouang, as the Chinese Government wanted, was estimated at a minimum sum of 80 million francs.

Earthwork and Track.

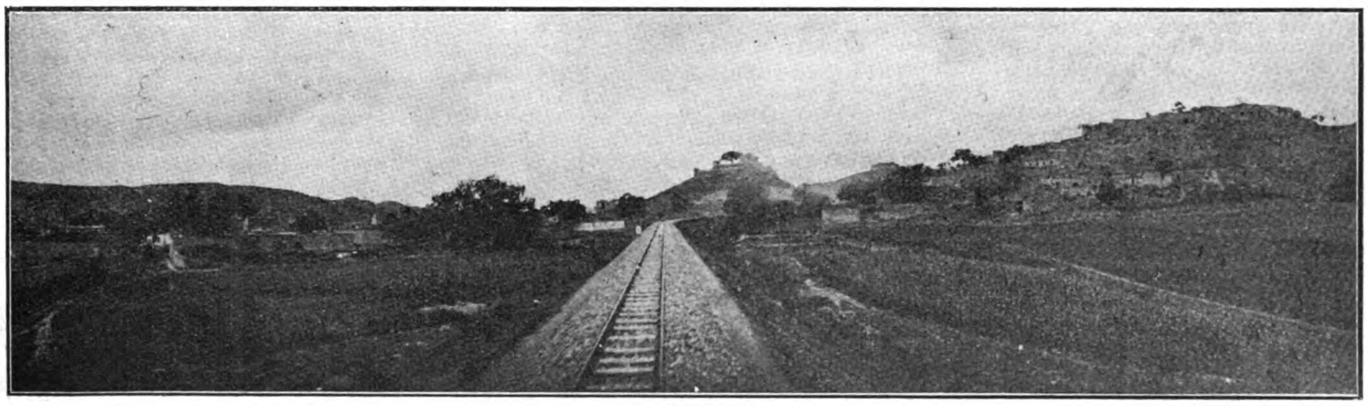
We have said that the work began in June, 1904. To Houe-Lou-Hien (kilometre 16) the earthwork in the loess was done quite rapidly with Chinese labor. From kilometre 24 the important work begins. After crossing the T'eou-Is-Yuen river over a bridge of 40 metres, the line runs over gullies in calcareous rocks, and under the Imperial post road over a loess filling 15 metres high. From kilometre 26 to kilometre 33 it is supported on terraces of loess, then runs through the tunnel of kilometre 43, which is 150 metres in length. The opening of the tunnel was a little difficult as the rocks, although hard, were cracked and intersected with pockets of clay.

Several routes were studied to bridge the Hsi-Hou-Ho river. Ordinarily it would appear more rational to make the crossing above the conflux of the two rivers, but this was impossible, so it was necessary to have three trusses of fifty metres each; then a grade from 23 to 30% traversing the village of Nan-Houng-K'eou.

It was more feasible to cross over the delta where the two rivers meet, and although costly this passage was cheaper than a crossing higher up the river.

In order to protect the embankment on the delta against the swift current of the Hsi-Han-Ho, there is a stone facing between the abutments of the 10 metres bridge and the 50 to 60 metres bridges; the facings are protected by masonry deflecting groynes which receive the first shock of the current. The water is imprisoned between the four masonry walls and then run off slowly, acting as a buffer against the shock of the following current.

Other facings protected by groynes and fillings were constructed to preserve the embankment against the strong current of the Mien-Chouei. The groynes were built over a masonry foundation carried below the bed of the two rivers, to avoid undermining. During



SHANSI RAILWAY—A LEVEL STRETCH

SHANSI RAILWAY—ONE OF THE VILLAGES THROUGH WHICH THE LINE PASSES

the floods of 1905 to 1910 the embankment withstood the strain satisfactorily.

From kilometre 46 to kilometre 56 the line runs through the loess in embankments approaching 17 metres high, and a cutting of 650 metres long and 10 metres deep.

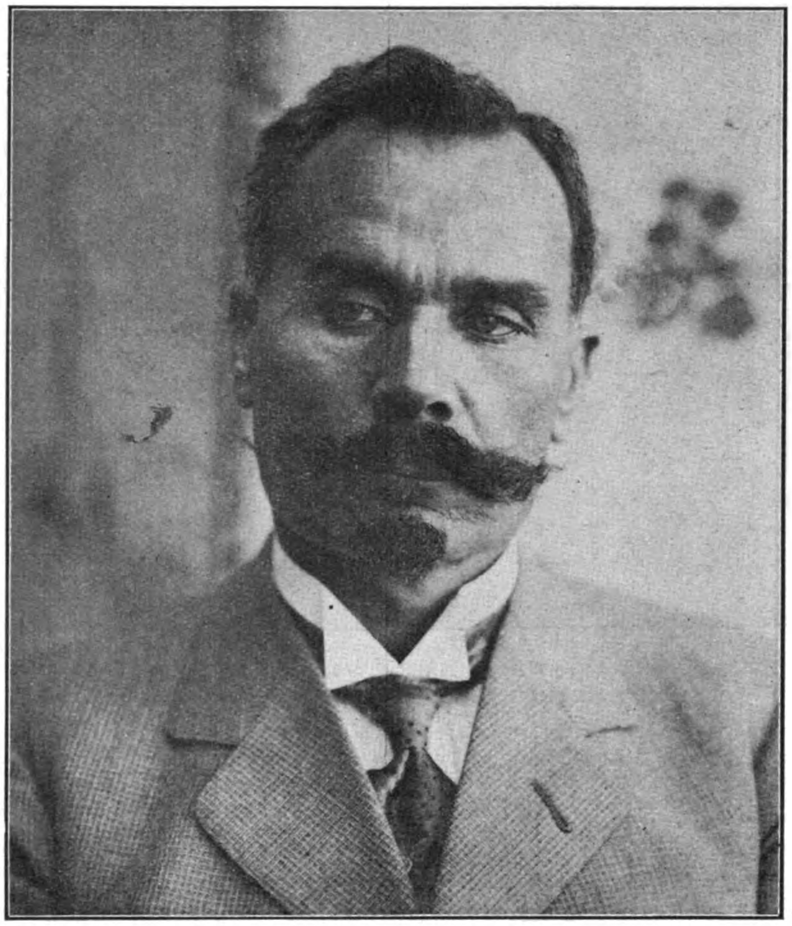
Great difficulties were encountered at kilometre 58. To cut down 60 metres of rock would have been expensive, as the rock was very hard, so it was found more economical to bridge over 50 metres and build a wall 100 metres long beyond kilometre 59.

The tunnel from kilometre 61 is pierced in hard rock, and emerges on a bridge of 75 metres, with a relieving arch of 10 metres. The rise is made by means of a service bridge with latticed beam, of 12 metres bearing, which serves also for the machines during the erection and rivetting of the bridge.

All the timber for temporary and false work used in bridge construction at kilometre 46, 60, and 61 was carried by coolies and then floated down the river. For the other big bridges the timbers were also carried by coolies and it was remarkable how the Chinese handled beams from 12 to 15 metres in length along the winding paths up steep mountain sides.

To diminish the difficulties, in floating the trusses temporary bridge were made of latticed beams, of 12.40 metres, the small timbers for which were carried by mules and donkeys, and the larger pieces by coolies.

Fifty metres from this metal bridge is a half-tunnel cutting over 30 metres long. The line continues over the flank of the mountain, profiting by all the ruggedness of the rock to act as supports for spans of 5 and 10 metres. The ravines are crossed by three viaducts with arches (of 10 metres), and piers 8 to 12 metres high. From kilometre 71, the ravine is passed by an arch. This bridge, as well as the preceding viaducts, were remarkably well constructed by a Chinese expert who, at the beginning, refused to accept the design; but under the influence of the Engineer-in-Chief he did the masonry in a way that could not be improved upon in Europe.



SHANSI RAILWAY—M. MILLORAT, ENGINEER-IN-CHIEF, UNDER WHOSE SUPERVISION THE LINE WAS CONSTRUCTED

VIADUCT OF GNIANG TZEU KOUAN.

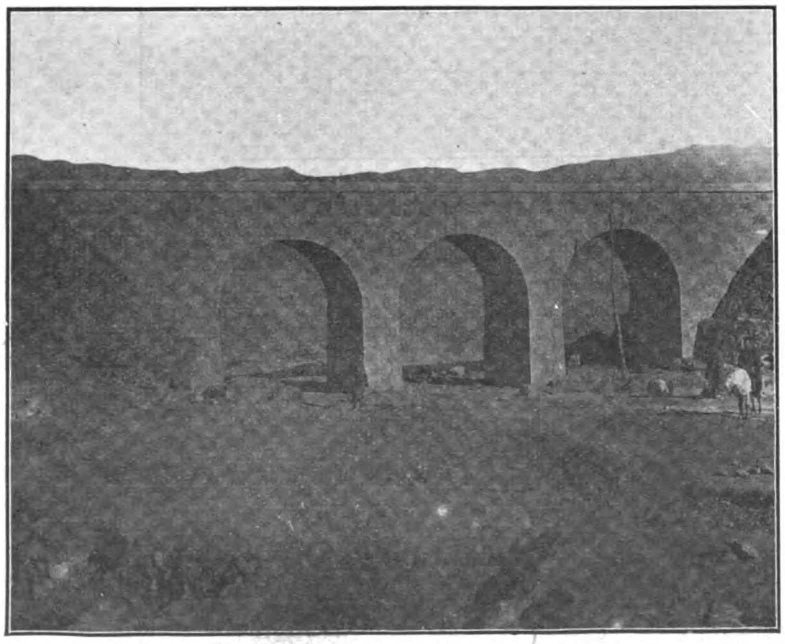
The largest viaduct on the line is at kilometre 74, and is situated at the foot of the town of Gniang-Tzeu-kouan. The railway follows the steep left bank of the river. On the right bank stands the town of Gniang-Tzeu-kouan, which extends over a plain to the foot of the mountains. This viaduct is 250 metres in length.

The first abutment was built over several springs spouting great jets 10 centimetres in diameter. After much excavation springs burst out and it was too late to change the direction; the sides of the cuttings had been well advanced and it was considered probable that had a change been made other springs would have been met with. The springs were plugged up with solid semi-crystaline limestone forming arches in some places and level in others. It would not have been possible to fill the springs by running in cement concrete; that would have been washed away at once. The base of the foundations was strengthened by placing large flat stones as close as possible one metre high on each side of the springs after having built the piers of the arches of limestone. Over these rough stones a rough box was placed as a frame for the masonry to take a massive concrete pier over 2.60 metres high, and round pillars were built over this.

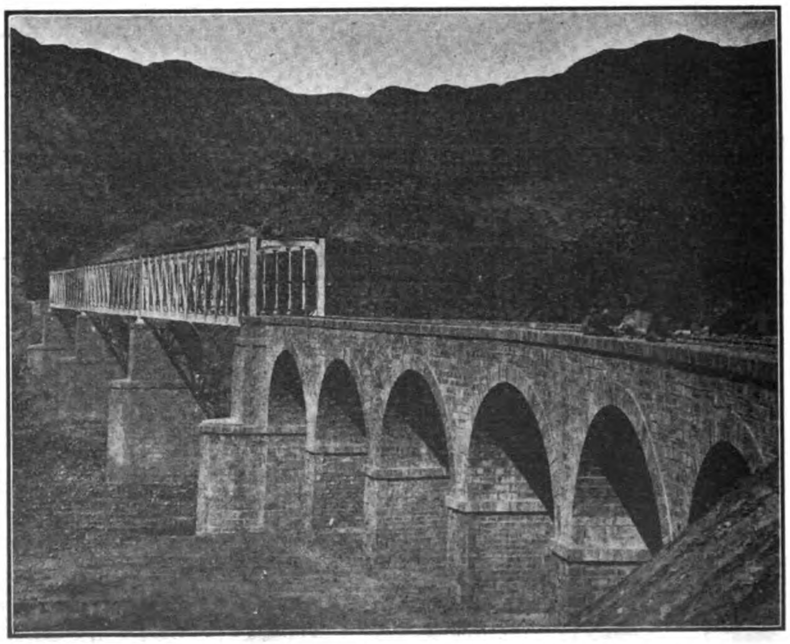
The construction of other columns did not present any difficulty. After freeing the foundations of water the engineers built the three pillars to two vaults of 10 metres with a viaduct of 100 metres radius.

From kilometre 75 to kilometre 90 the river runs straight, with perpendicular banks. It was impossible to lay the line on the river banks owing to the possibility of it being washed away, as the waters rise as much as 8 to 10 metres in a night and an embankment of 12 metres would have been necessary. The direction taken was judiciously chosen to avoid high supporting walls to the deep cuttings. It was necessary in many cases to pierce a tunnel in the steep banks.

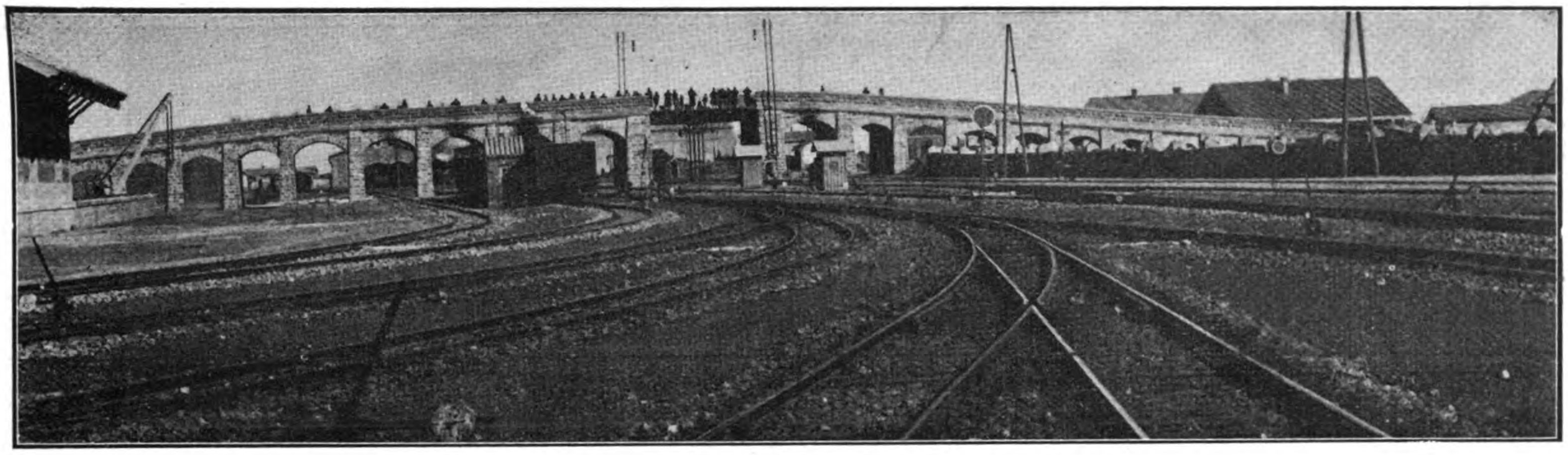
In these 15 kilometres there are five tunnels, of which two are 300 metres long, all on curves. The others vary from 130 to 170 metres long. To expedite the piercing of these tunnels operations were commenced simultaneously. One of the 300 metre tunnels, which could be opened in two points only, was completed in seven months, the work being



SHANSI RAILWAY—BRIDGE OF THREE 10 METRE ARCHES AT KM. 70



SHANSI RAILWAY—VIADUCT ACROSS THE GNIANG TZEU KOUAN AT KM. 73



SHANSI RAILWAY—OVERHEAD WAY AT CHEU KIA TCHOUANG

done at the rate of 1.40 metres per 24 hours work. During these seven months, one month was lost through Chinese holidays, New Year, Dragon festival, etc. All the work, together with the masonry, was done by a Chinese contractor.

At this place seven large viaducts with arches of from 5 to 10 metres span, were constructed, as well as a metal bridge of 75 metres with arches of 10 metres, being an exact repetition of the approach to kilometre 61.

The cutting entered on emerging from the tunnel at kilometre 87.800 is through loess with sides 26 metres high.

The construction from kilometre 90 to kilometre 188 was particularly difficult owing to the quality of the rock met with, especially in the tunnels, where fissures and pockets of clay to the full depth of the tunnels were found. In this locality there are several large viaducts with spans of from 8 to 10 metres. The river is crossed at kilometre 188 by a bridge of 65 metres and two arches of 10 metres each. These large spans were preferred, in certain points, to avoid constructing high piers in strong currents with doubtful sub-soil, and to minimise the risk of bad masonry by Chinese workmen.

From kilometre 122 to kilometre 151 the railway skirts the side of the mountain, is laid on beds of anthracite, several cuttings being in seams of coal. There are four cuttings from 20 to 26 metres deep in the loess, and one, practically in sandstone, with sides 40 metres high. The small and the large ravines have necessitated a large quantity of variable and important work.

At kilometre 144 is found a piece of the finest railway work in central or North China, a stone viaduct 90 metres long. The centre span is 20 metres, and the outer ones 10 and 5 metres. The rail is 19 metres above the bed of the river. This viaduct was built of beautiful sandstone piers by Chinese workmen, under the direction of the Chief Engineer.

From kilometre 151 to kilometre 170 the earthwork is through loess.

A sinuous defile with high and steep banks of red sandstone is penetrated to Chang Hon The water rises to 10 or 11 metres over the thalweg and the swellings are signalled by the countrymen. Several cuttings could have been avoided by crossing the river in several places by metal bridges of less than 75 metres. It was preferable to cut the banks on account of the difficulty of procuring good stonework in this part and also because earthwork is cheaper even though the curves of the bank had to be followed.

From kilometre 155 to kilometre 195 there are 850,000 cubic metres of earthwork, of which two-thirds are red sandstone; in this same portion there are five tunnels varying from 120 to 160 metres in length, a bridge of 50 metres of broad gauge, a bridge of 100 metres (two trusses of 50) and a bridge of 75 metres at kilometre 191. From kilometre 202 to kilometre 243 (sampan harbor of Tai-Iuen Fou) the earthwork shows nothing in particular.

It seems indiscreet to make cuttings 26 metres deep in the loess. It was impossible to evade this. It would also seem improbable that the loess would remain upright at these great heights, but it may be remarked that the loess upon which the sun shines during the summer remains vertical and supports a great weight, whereas the cuttings are made in the beginning of winter when the loess in a little wet, the latter freezes, and thaws, and can later be seen breaking away in slabs of from 30 to 40 centimetres thick along the whole length of the sides.

The small bridges up to three metres span are of wood. In places they are steel beams of 5 metres, 6 m 40, 7 m 60, 10, 20, 40, 50, 65 and 75 metres capacity.

The load calculations for the bridges were made on the French principle of August 1891. They were based on the hypothesis employed by trying one or several trains composed of two locomotives of 45 tons each, followed by wagons loaded to 30 tons. The trials were very severe and gave every satisfaction.

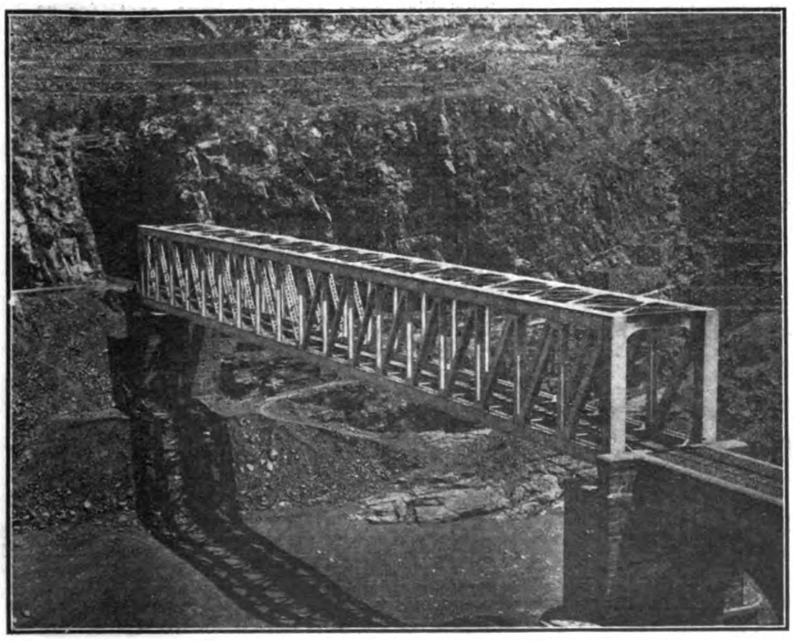
Superstructure.

The track is 4 metres wide. The width inside the rails, in the curves of a radius of 300 metres and over, is 1 metre, and in those of lesser radius 1.015 metres.

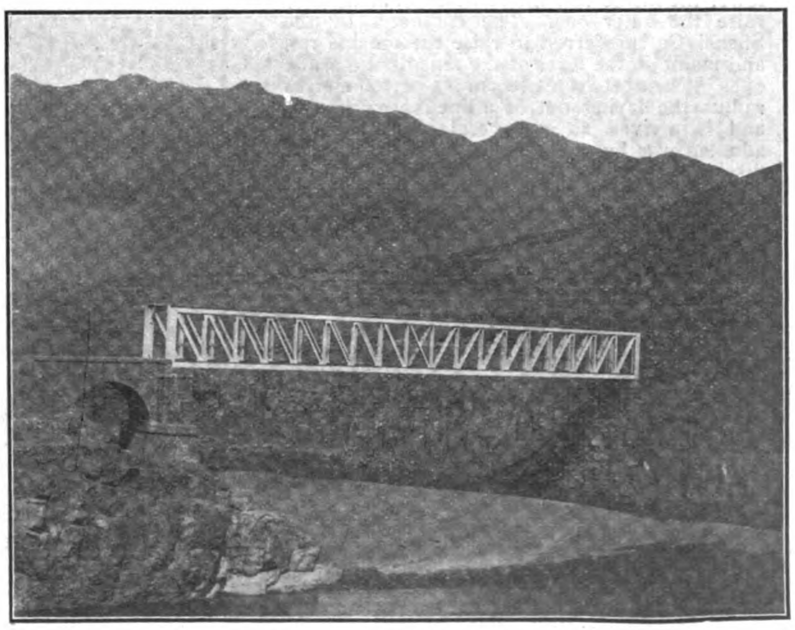
The steel rails are of the Vignole type weighing 28 kilogrammes per metre, nominally 9 inches long. They are fixed by steel turrels with intermediary saddles on wooden sleepers.

All the sleepers are of Narawood (Japanese oak) and Tamo (Japanese beech). The sleepers are normally spaced Om 225×Om 15.

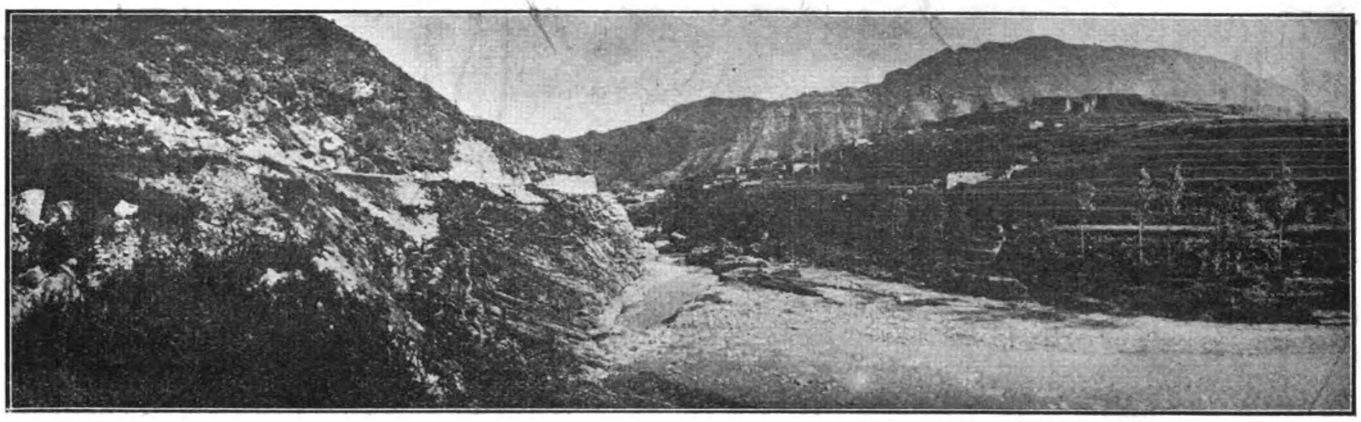
The splints are in steel of Om 45 in length and weighing 5.625 kilogrammes for the interior splints and 5.475 kilogrammes for the exterior splints. They are pierced with four

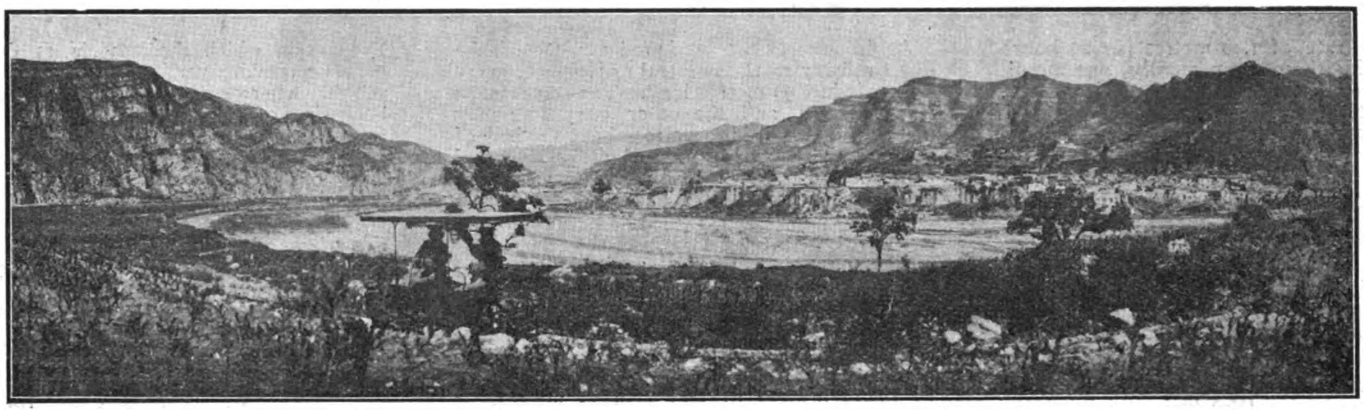


SHANSI RAILWAY—75 METRE BRIDGE AT HSIA PAN CHEU



SHANSI RAILWAY—STEEL BRIDGE OF 75 METRE AT KM. 190





SHANSI RAILWAY—TWO VIEWS ILLUSTRATING THE CHARACTER OF THE COUNTRY THROUGH WHICH THE LINE PASSES

holes. The saddles join the splints in a way to oppose the displacement of the longitudinal rails.

After laying the inside rails of the curves of 300 metres radius turrels were placed over a certain number of sleepers to prevent the displacement of the rails.

The rise of the exterior rail was calculated on a supposed speed of 32 kilometres per hour; it is Om. o8 for a radius of 100 metres. Nevertheless a speed of 40 km. and 45 km. on curves of 100 is made daily.

Several companies use a rise in relation to the gauge, with its level over the axis, and lower the inside rail the same amount as they raise the outer one. The engineers of the Shansi Co. preferred to raise the outside rail and maintain the level of the axis of the inside one. When between two curves of 100 metres radius the laying out of a line is very simple, and is arrived at in several ways, the one adopted was by parabolic levelling where the displacement of the curve permitted.

Where two successive declivities differ more than one millimetre per metre they were joined by a series of inclined planes nine metres long differing between themselves with slopes equivalent to two millimetres per metre.

MATERIAL AND TRACTION.

The working locomotives were designed with capacity to two relatively heavy trains over slopes often exceeding 20 m/m, and comprised the following.

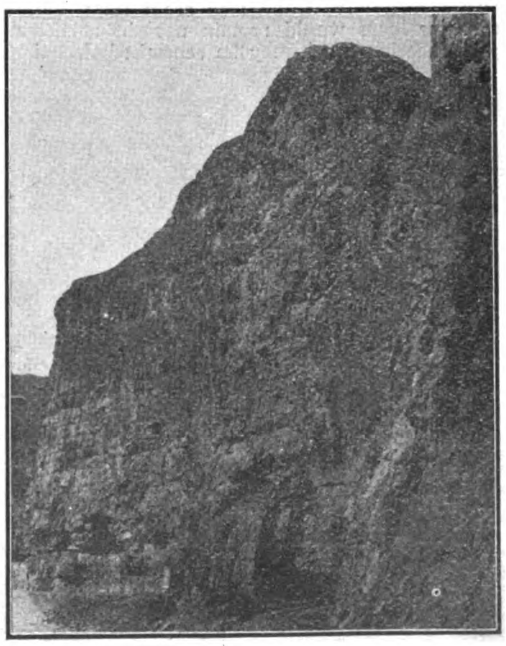
32 Engines, Series 100; 6 Engines, Series 200; 12 Engines, for construction; 1 Engine, for normal gauge.

The engines series 101 and 201 are furnished with Clayton hand clamps for detaching purposes.

One locomotive, series 101, has a pulling capacity of 8 wagons of 30 tons each in winter and 9 in summer, of 11 tons tare and 20 tons, working over slopes of 15 m/m at 15 kilometres per hour.

One locomotive, series 201, has a hauling capacity of 10 carriages over slopes of 21 m/m at 22 kilometre per hour. They are specially attached to passenger trains.

A speciality of these locomotives is the position of the driver which allows him to see the signals and the road unhampered by either escaping steam, or smoke from the funnel. In effect, the ideal working position of these engines is with the chimney to the rear. Other engines, series 201, have a water tender attached to them.



SHANSI RAILWAY—THE ENTRANCE TO THE TUNNEL AT KM. 97

The passenger carriages are: 3 first class carriages; 10 mixed (1st and 2nd); 25 third class; 7 carriages for the chief engineer, of which one was of normal gauge for use from Cheu Kia Tchouang to Peking and Tientsin.

The first class and mixed carriages have side passages to the lavatory; they are provided with hand clamps for attaching and detaching. They have covered platforms at each end. The first class carriages have seats for 14, and the mixed for 20 passengers.

The third class carriages have seats for 23 passengers on each side with a passage in the centre. These have also a covered platform, and a lavatory, and are attached and detached in a manner similar to the first-class carriages.

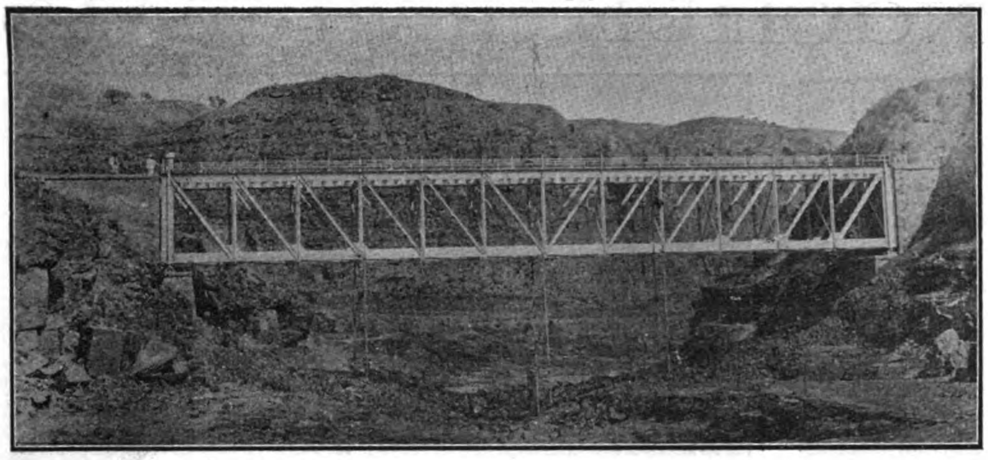
Three third-class and one first-class carriages were converted for the use of the engineers and supervision staff; the furnishing of these carriages includes dining-room, sitting-room, bed-room, kitchen and toilet, etc.

All the carriages were built on bogie chassis with wheels of O M 70 diam. The carriages are hooked in sets and heated by steam from the engine.

The length of the chassis is 9.16 m. the width 2.60 m and the height of the frames 2.527. The platforms at each end are O. 75 m. wide. The total length over all is 12.21 m. The tare weight of these carriages averages 25-50 tons; the first class are 16 tons.

There are 8 postal and 8 luggage vans, built on chassis of the same dimensions as the carriages, and are divided into two compartments, with a lookout or glass covered observation seat in each compartment.

The luggage vans have an air valve in the guard's compartment, surmounted by an indicator which works the brakes for a quick stop, these valves work automatically when the driver applies his brake or they may be operated individually by the guard.



SHANSI RAILWAY—TYPICAL STEEL BRIDGE OF 50 METRE AT KM. 180

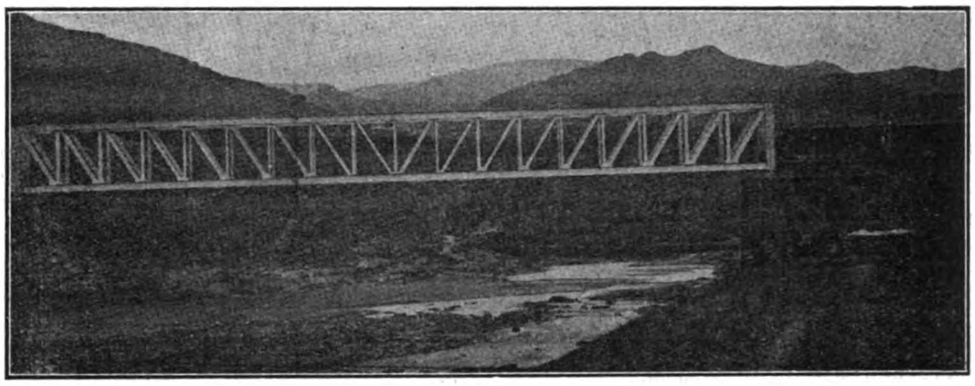
There are 440 of these wagons and comprise the following:—

Blind wagons 2; covered 80; flat stepped 10; tilting or dumping 196; high sided 40; medium high 38; tank 6; assisting 2; extension bogies 4; P. F. 27; N. F. 36; 3 bogies and two frames, 1 with special attachments.

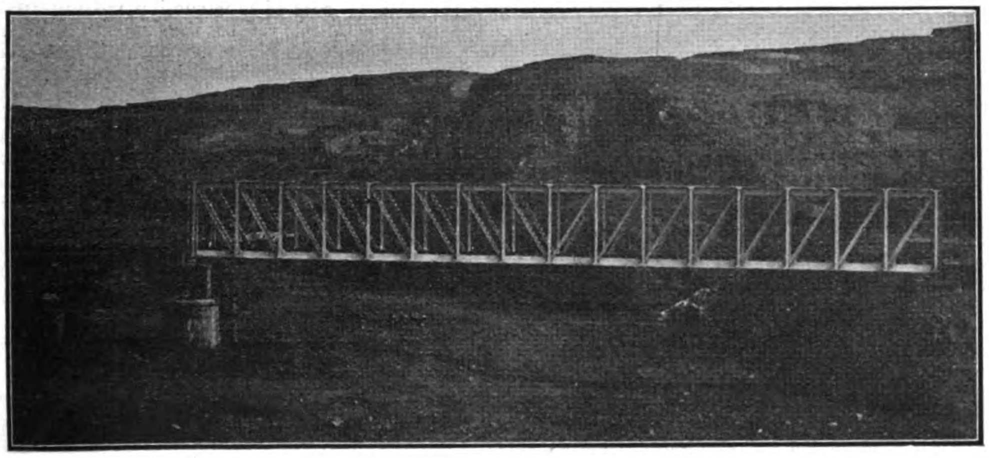
The chassis of the covered wagons are 8.20 m. long and 2.20 m. wide, the frame 8.45 m. long and 2.39 m. high; with a covered passage at one end. They have sliding doors. Some of the goods wagons have windows and others have a compartment for the guard

The coal cars are 8.40 m. long and are intended for the transportation of anthracite and oil. They are 11 tons and carry 20 tons, 25 of them are larger (10.26 m) and carry 25 tons.

The chassis of the flat wagons are 9.22 m. over 2.20 m. Some of these have platforms 0.40 m. high whilst others have steps fixed to the side of the chassis.



SHANSI RAILWAY—75 METRE BRIDGE AT KM. 190



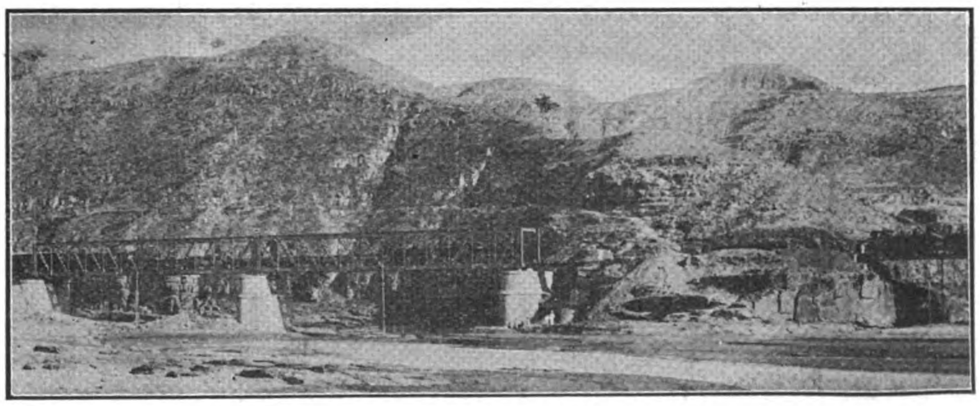
SHANSI RAILWAY—65 METRE BRIDGE AT HSIA OU TOU

The bodies of these wagons are 8.60 m. long and 1.22 m high; with a platform all around. They weight 11.5 tons empty. They are in daily use for the transport of very large blocks of anthracite. The sides are not strained by this work.

The tank wagons have a capacity of 25.3 m. and are mounted on chassis measuring 9.20 m. long (inside measurements). They are intended for the transport of petrol. Two of these, which are in different shape from the others were made in the workshop at Cheu Kia Tchuang.

There are 66 of these wagons of which 30 are similar to the flat wagons and carry 30 tons, the remaining 36 are smaller, 7.06 m. in length (over all) and carry only 10 tons.

There are three workshops for repairs, one at Cheu Kio Tchuang, one at Iang Ts-luen, and one at T'ai Yuan Fou.



SHANSI RAILWAY—STEEL BRIDGE AT KM. 185

HONOURS FOR RAILWAY-MEN IN CHINA

RAILWAY MINISTER'S RECOMMENDATIONS

The following have been recommended by the Minister of Posts and Communications for honours:—

FIFTH CLASS: of the Chia Ho or "Felicitous Grain"

A. W. U. Pope, General Manager, Shanghai-Nanking Railway.

M. Bouillard, Chief Traffic Manager, Kin-Han Railway.

M. Ebray, Chief Engineer, Pienlo Railway.

SIXTH CLASS;

J. E. Foley, Traffic Manager, Peking-Mukden Railway.

W. Henderson, C.A., Chief Accountant, Peking-Mukden Railway.

D. P. Ricketts, M.I.C.E. Engineer-in-Chief, Peking-Mukden Railway.

A. G. Cox, Asst. Engineer-in-Chief, Peking-Mukden Railway.

M. Orphanides, Chief Engineer Maintenance Dept. Kin-Han Railway.

J. Barber, General Manager, Taokow-Chinghua Railway.

E. R. Morriss, Secretary, Shanghai-Nanking Railway.

A. C. Clear, Supt. Permanent way and works, Shanghai-Nanking Railway.

Frank Grove, Engineer-in-Chief, Canton-Kowloon Railway (Chinese sec.).

SEVENTH CLASS:

M. Marchand, Chief Engineer Locomotive Dept., Kin-Han Railway.

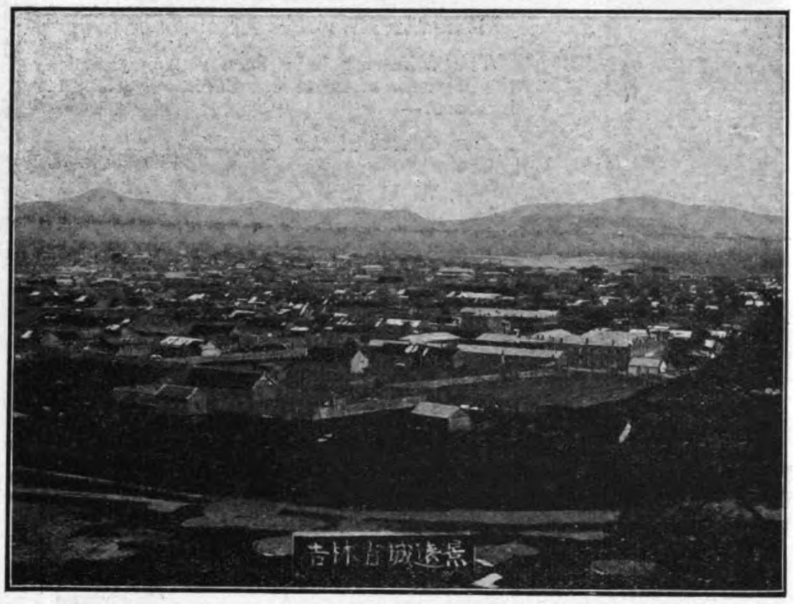
W. H. Steele, Asst. Traffic Manager, Peking-Mukden Railway.

A. de Challoy, Acting Supt., Locomotive Dept., Tcheng-tai Railway.

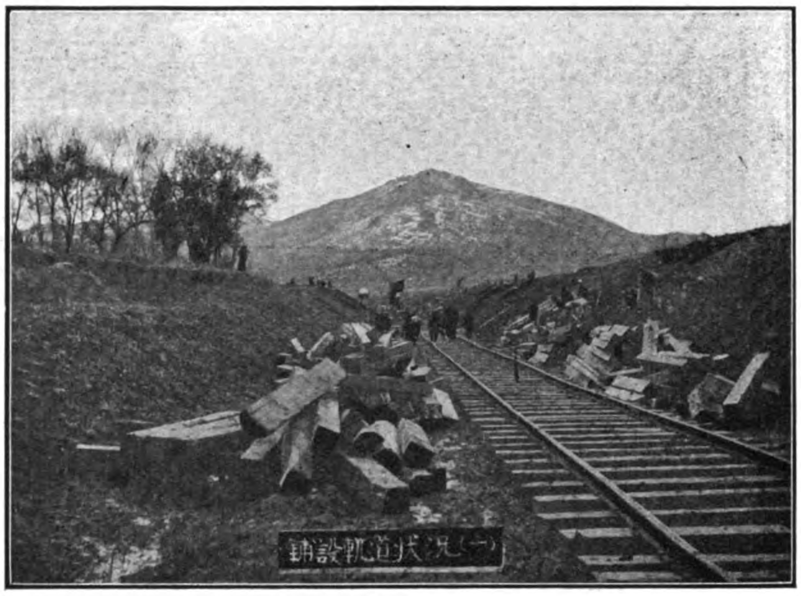
R. Lallemand, Engineer-in-Chief, Tcheng-tai Railway.

J. de Lapeyiere, Chef du service des voies et travaux, Tcheng-tai Railway.

KIRIN-CHANGCHUN RAILWAY



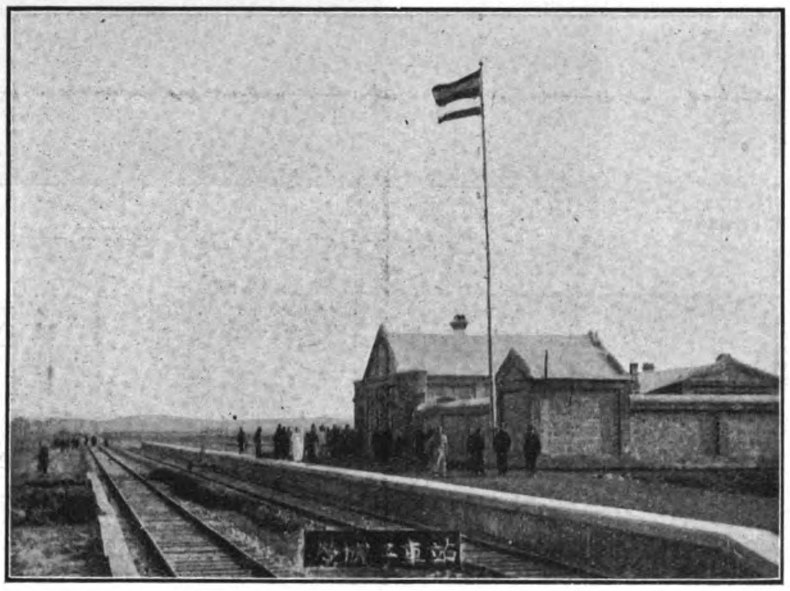
KIRIN-CHANGCHUN RAILWAY—BIRD'S-EYE VIEW OF KIRIN CITY



KIRIN-CHANGCHUN RAILWAY—TRACK LAYING NEAR KIRIN

In the November number of the FAR EASTERN REVIEW we announced that the Kirin-Changchun Railway had been opened for passenger and goods traffic on October 21st. Some particulars of the line were then given, but these we are now able to supplement, and also to reproduce some photographs illustrative of the country through which the new railway passes. The information is not so full as we would like to have made it, as the final figures in regard to the cost of construction are not yet available.

The line connects Kirin, the capital of the province of that name, with Changchun, the point where the Japanese and Russian systems in Manchuria meet. Its length, exclusive of sidings, is 79 miles. The temporary line leading to the cut over the Tumenling Pass has a gradient of 1 in 30, but the use of this temporary line will of course, be discontinued as soon as the tunnel is completed. The maximum gradient on the line proper is 1 in 100 and the radius of the sharpest curve 1,320 ft.



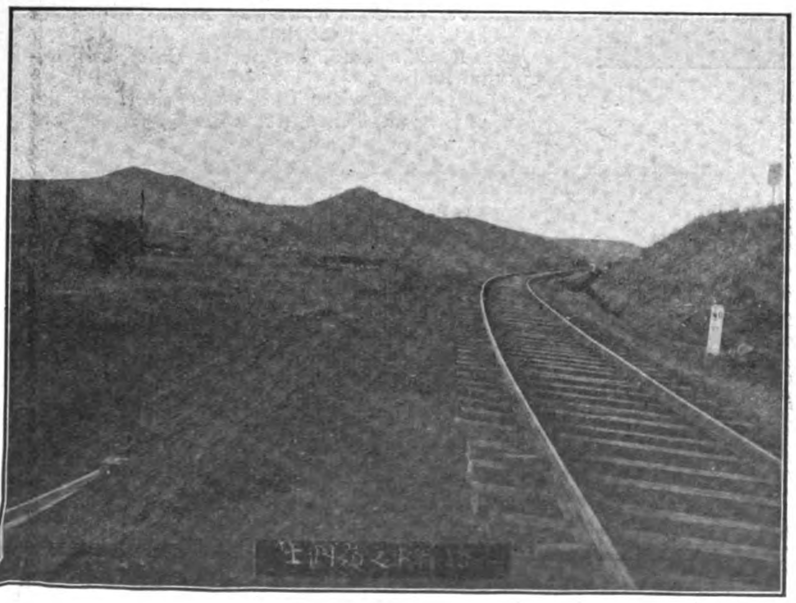
KIRIN-CHANGCHUN RAILWAY—YIU CHEN TSE STATION

The total bridge openings amount to 3,926 ft. and the total culvert openings to 133 ft.

Although, as already stated, owing to the final figures not being available we cannot give the total cost of construction, we understand that up to the end of October, 1912 Tls. 3,500,000 had been spent. This includes the cost of construction of the line, buildings, rolling stock and shops; the price paid for land, salaries, and general expenses.

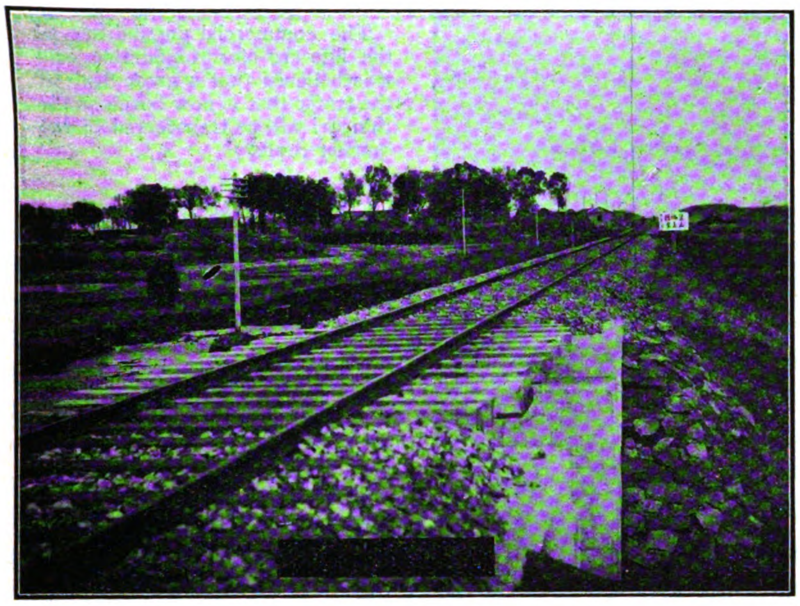
The traffic returns for November were as follows:—

Passengers	$28,968.65
Freight	$34,971.34
Total........	$63,939.99

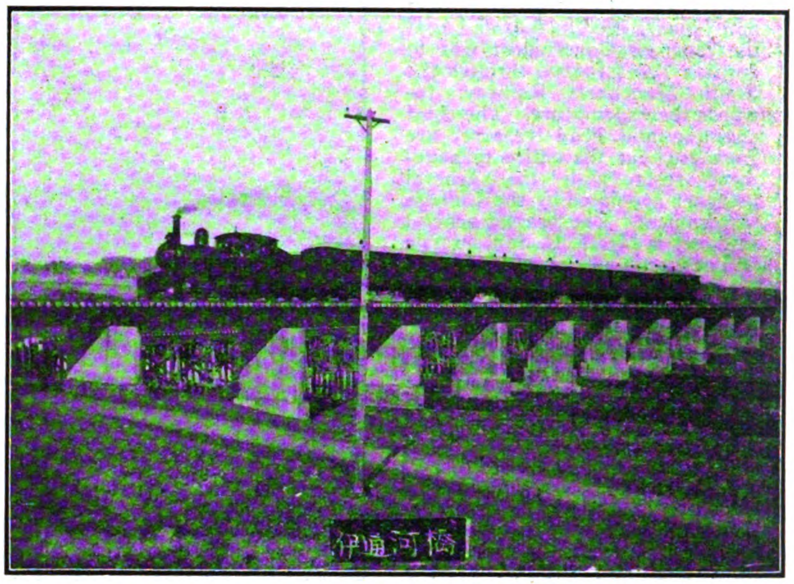


KIRIN-CHANGCHUN RAILWAY—APPROACHING THE TUMENLING PASS

KIRIN-CHANGCHUN RAILWAY—CHANGCHUN STATION AND STAFF

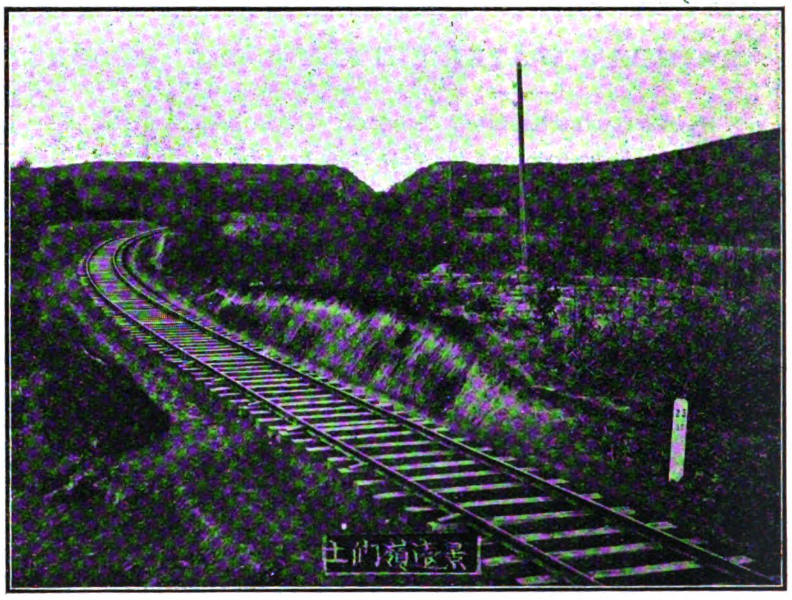


KIRIN-CHANGCHUN RAILWAY—A STRAIGHT RUN NEAR KA LUN

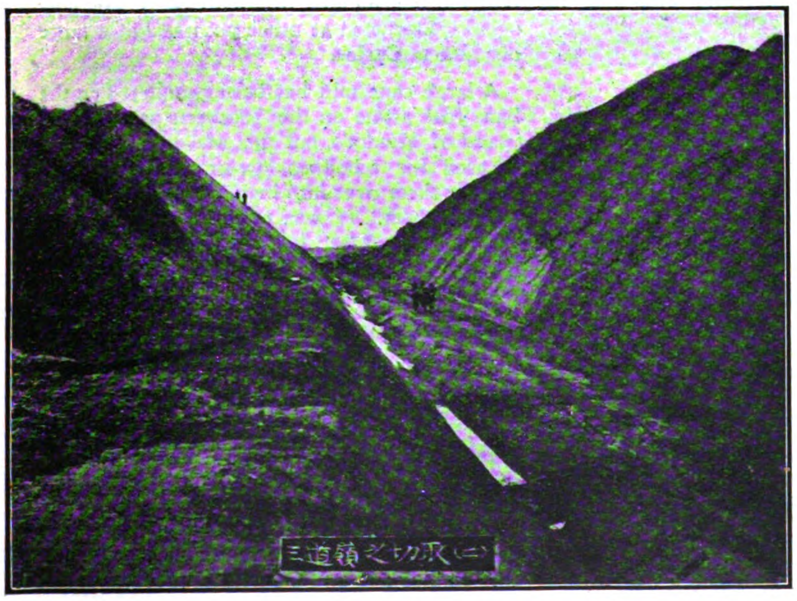


KIRIN-CHANGCHUN RAILWAY—YI-TING HO BRIDGE

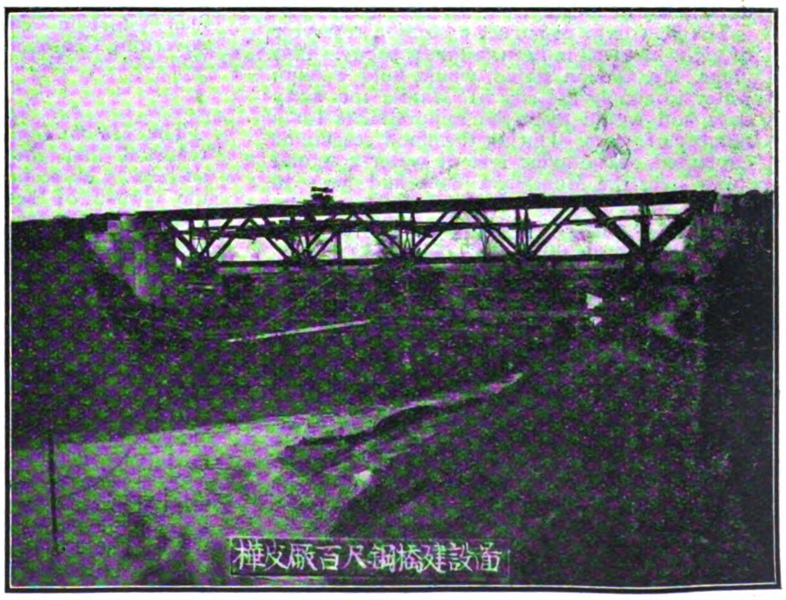
KIRIN-CHANGCHUN RAILWAY—THE SUNGARI RIVER AT KIRIN



KIRIN-CHANGCHUN RAILWAY—APPROACHING THE TUMENLING PASS FROM THE WEST



KIRIN-CHANGCHUN RAILWAY—SEVENTY FEET CUTTING AT SAN-TO LIU



KIRIN-CHANGCHUN RAILWAY—HUA PI CHAUN DECK TRUSS

By the treaties between China and Japan signed in 1907 and 1908 the Japanese Government was to furnish *Yen* 2,150,000 through the South Manchuria Railway, towards the expenditure. The chief engineer and head treasurer are Japanese, but the entire management rests with the general manager appointed by the Chinese Government. The present general manager is Mr. T. C. Sun, an able and energetic official.

Work on the line was started in December 1909. Surveys were started from both termini. The first Chinese manager was Mr. Fu Po-liang. The work of construction was retarded owing to several changes in the management, and also by the severe climate. Even at the beginning of May the ground is found to be freezing at a depth of one foot. Practically construction work could only be carried on for five months in the year. The work was also delayed by the outbreak of plague.

KIRIN-CHANGCHUN RAILWAY—YIN-MO HO BRIDGE

The commercial possibilities of the line are most favourable, and it is believed that a great deal of the traffic that is now borne on the Sungari will be transferred to the quicker route.

ROLLING STOCK

2	Shunting Engines
7	Freight and Passenger Engines
1	Private Car
4	First and Second Class Composite Cars
10	Third Class Passenger Cars
1	Thirty ton Freight Car
40	Thirty ton Covered Cars
10	Twenty ton Covered Cars
27	Thirty ton Coal Cars
20	Thirty ton ballast Cars
4	Brake vans.

MANILA'S WATER SUPPLY

800,000 GALLON RESERVOIR PROJECTED.

The old scheme to utilize the flow from the Pagsanjan falls for Manila's water supply to insure a sufficiency for all times of the year, which was revived recently to the extent of being submitted to the acting governor general with recommendations, has probably reached its last resting place, in the hands of Chief Engineer A. Gideon of the department of sewer and waterworks construction, to whom it was referred on December 27 by the municipal board.

Mr. Gideon explained, when questioned by a *Manila Daily Bulletin* representative, that engineers from his department are now in the field locating sites for additional storage reservoirs to connect with the present source of supply from the Mariquina river at the Montalban dam. Two sites are already in view, said Mr. Gideon, on the Manila side of the Mariquina river. One has been surveyed and the bureau of science has been asked to send geologists to determine if the ground is sufficiently water tight to warrant building a dam. The other site is a mile and a half nearer the city and is being investigated with a view to economy of construction and desirability of location.

The plan is to construct a storage reservoir of eight hundred million gallons capacity. This alone, Mr. Gideon stated, would hold enough water to supply the city of Manila for sixty days and would meet the requirements for a number of years. During the flood season, he explained, 60,000 cubic feet of water a second flows over the Montalban dam and goes to waste, while in the dry period the volume dwindles to only six cubic feet. The quantity of the overflow during the rainy season, he said, is 13,000,000 gallons every half minute, which is enough to supply the city for a whole day. The Montalban dam reaches a depth of 40 feet and the chief engineer asserted that repairs during the year have reduced the leakage from 28,000,000 to 14,000,000 gallons a day. The total flow during the dry weather now is 11,000,000 gallons a day, which is about 2,000,000 gallons short of the city's requirements. With the proposed 800,000,000 gallon reservoir in addition to the three now in use the supply will be brought up close to the present pipe line system capacity, which is 22,000,000 gallons a day. It is estimated that the consumption will reach this limit by about 1925, when additional piping will have to be laid.

RECONSTRUCTION OF CANTON

The fire which took place in Canton on the night of November 9th, says a correspondent writing to the *Hongkong Daily Press*, may be a blessing to the city, if not to the few insurance companies who have to liquidate their business because of the heavy losses. The Government, according to Mr. H. L. Wu, Acting Superintendent of Public Works, will take a new survey of the burned district and cut the land into blocks, and will not issue any new permits for buildings until the rules and regulations for the improvement of that district into a modern city are complied with. The Governor-General, Wu Hon-man, has already signified his approval of the plan and will formally put the rules into force as soon as they are ready in detail.

Superintendent Wu is acting for Mr. R. C. Johnson, who is travelling with Provincial Treasurer Liu to Peking on financial business connected with the Government. Supt. Wu will have the opportunity to plan for Canton, at least a part of it, a modern town. Supt. Wu is a graduate of Canton Christian College and the University of Illinois. He is one of the many foreign educated young men now governing Canton.

The *Manila Daily Bulletin* of December 19 reported that the installation of the Otto suction 75 horse power gas producing plant at the bureau of science, medical school, and Philippine General Hospital, for generating electricity has been completed. The contract calls for three months of operation absolutely free during which time it must give complete satisfaction or the firm that installed it must tear it down and remove it.

An expert was sent to Manila from Germany to superintend the erection of the plant, which was designed especially for Bataan coal fuel and 500 tons of the product of the Bataan mine has been laid in. This amount, it is claimed, will operate the plant for a period of two years and generate electric current for all purposes. Mr. McGregor, chief of the building department of the bureau of public works, stated that if the Bataan mine resumed operations it was likely that more of these gas plants would be installed, as current can be supplied by this means very cheaply.

SUGAR IN THE PHILIPPINES

The reports of the exports of Philippines sugars show that there were 110,604 tons in 1909 and the exports rose to 183,077 tons during the fiscal year ending June 30, 1912, reports the *Louisiana Planter*, and continues:—As is well known, these sugars produced in the Philippines and thus exported are generally of very low grade and similar to that vast crop of over two millions of tons of cane sugars made in India and consumed altogether at home.

Now, for the first time, a more modern style of sugar house has been equipped and put in operation near La Carlota in western Negros and a small mill was erected with a capacity of grinding 150 tons of cane per day. We understand that this was turned out in the usual vacuum pan style, with centrifugal purging machines and that the sugar brought 4½ cents in Iloilo from the wholesale dealers. It is stated that a number of small mills are now being constructed at other points, and a large one at San Carlos.

A large cane mill has been completed on the San Jose estate on the southern part of the island of Mindoro, but this season it will only be used for reboiling low-grade sugars and making them over into higher grades, or semi-refining them. It was reported that on this estate some 2,500 laborers were at work preparing land and planting cane, with 800 acres already planted.

These vacuum pan and centrifugal sugar houses, producing hard crystals of sugar instead of the soft muscovado sugars hitherto produced, will quickly work a revolution in the sugar industry in the Philippines. The Hawaiians are now making about ten times as much sugar as they thought was their extremest limit less than forty years ago. Things move more quickly now in these days of big steamships and wireless telegraphy, and the Philippines are apparently as near to us, or nearer even, than the Hawaiians.

ROYAL STATE RAILWAYS OF SIAM

REPORT FOR THE YEAR 130 (1911-1912)

The Royal State Railways of Siam are making slow but steady progress. In the excellent administration report for the year 130 (1911-12) presented to H.E. Chow Phya Wongsa Nuprabhadh, Minister of Communications, by the Director-General of Railways, Mr. L. Weiler, on August 28, 1912, it is stated that the total length of line open to traffic was 951.8 Km. Since the report was issued, however, an additional 71.2 Km., including the 10 Km. section from Meh Puak to Pak Pan, on the Northern Line, has been opened and consequently the total length of State Railways now open to traffic is 1,023 Km.

Lines in operation:—The report under consideration deals only with the following lines:—

a, Standard gauge:—

	Km.
Bangkok-Korat ..	264.1
Ban Phaji-Meh Puak	437.5
Ban Dara-Sawankaloke	28.9
Bangkok-Petriu	63.4
Branch to Menam River Bangkok	6.5
Total ..	800.4

b, Meter gauge:—

Bangkok Noi-Petchaburi	151.4
Total ..	951.8

Capital:—The capital outlay from the commencement on all open lines amounted at the close of the year 130 (1911-12) to Ticals 61,924,423 as specified in the following list:—

Line	Specification of capital outlay Tcs.
Bangkok-Korat	17,673,189
Ban Phaji-Meh Puak	28,570,640
Ban Dara-Sawankaloke ...	816,582
Bangkok-Petriu	3,424,43[illegible]
Branch to Menam River station	614,150
Bangkok Noi-Petchaburi ...	8,115,878
Extensions and Improvements	2,661,526
Various Surveys	48,125
Total Tcs.	61,924,423

Financial Results:—The gross receipts amounted to Ticals 4,623,683 as against Ticals 4,526,765 in the preceding year, an increase of Ticals 96,918 or 2.14 per cent. The working expenses decreased by Ticals 111,717 to Ticals 1,676,779 or 6.24 per cent. The net earnings increased by Ticals 208,635 or 7.62 per cent., to Ticals 2,946,904. Deducting Ticals 327,411, contribution to renovation fund, the actual net profit was Ticals 2,619,493 an increase of Ticals 201,922 or 8.36 per cent. The percentage on capital cost was 4.26, an increase of 0.16 per cent. The estimated receipts for 130 were Ticals 4,285,000 so that this estimate was exceeded by Ticals 338,683, while the expenditure was estimated at Ticals 1,937,032 and consequently a saving of Ticals 260,253 was made.

Revenue:—Receipts from ordinary passenger traffic showed a slight increase of Ticals 17,921, the total receipts from this source being Ticals 2,811,244. The number of passengers decreased from 3,155,160 to 3,132,903. The average fare paid per passenger was Ticals 0.90, and the average distance travelled per passenger was 44.61 Km. There was an increase of Ticals 147,665 in the receipts from special trains, owing to the extensive military transports on account of the Coronation festivities.

ROYAL SIAMESE RAILWAYS—THE PASS TUNNEL AT KM. 426 OF THE NORTHERN LINE, UNDER CONSTRUCTION

Good and Live Stock:—There was a falling off both in the goods traffic and in conveyance of head of live stock in 130 (1911-12) as compared to 129 (1910-11). In 130 the tonnage of goods forwarded was 298,238 as against 314,819 and head of live stock 123,630 as against, 137,699. The financial return fell from Ticals 1,607,006 in 129 to 1,539,859 in 130. It is explained that the falling off in goods traffic was wholly due to the decrease in the paddy traffic in February and March. The average receipt per ton was Ticals 5.01 and the distance goods were carried averaged 184.08 Km.

Rolling Stock:—At the close of the year the rolling stock in hand was:—

67 locomotives
250 coaching vehicles
944 goods vehicles

The number under order was:—

2 locomotives
11 coaching vehicles
20 goods vehicles.

Damages by floods and rainfall:—1). North line. Owing to heavy rains slips occurred in various cuttings of the newly opened section between Pang Ton Pung and Meh Puak and caused interruption of the traffic from 8th to 10th September—3 days.

2). Petchaburi line. In consequence of torrential rains causing damage to banks and bridges, through communication was interrupted between Ratburi and Petchaburi from the 22nd October to 2nd November—12 days.

Personnel:—The total number of railway employees at the end of the year under review was 2,710 as against 2,904 in the previous year.

Improvements and Extensions:—The sum of Ticals 137,333 was spent for improvements and extensions on the lines open to traffic.

UTARADIT-MEHPUAK LINE

History of the line from Utaradit (Tha Sao) to Meh Puak (Km. 399.0 to 437.6), opened to traffic:—

Tha Sao—Pang Ton Pung 15th August 1909.
Pang Ton Pung—Meh Puak 1st June 1911.

When in April 1909 the Government decided to postpone the continuation of the Northern Line, Sala Meh Puak was taken in view as the temporary terminus owing to its close vicinity to Muang Prae and in consideration of the works having already advanced to a considerable extent so far. Construction works on the section under report were commenced in February 1907. On 15th August, 1909, traffic was opened to Pang Ton Pung (Km. 418.5) at the foot of the hill range which forms the waterparting between the Menam Yai and the Meh Yom. The crossing of the range was connected with various engineering difficulties. A series of banks and cuttings of over 20 m height and depth respectively, had to be negotiated and at Km. 422.3 to 423.3 it seemed advisable for economical as well as technical reasons to construct a tunnel of 109 m and a viaduct of 82.6 m length in substitution of a cutting and a bank measuring 33 m in depth and height respectively.

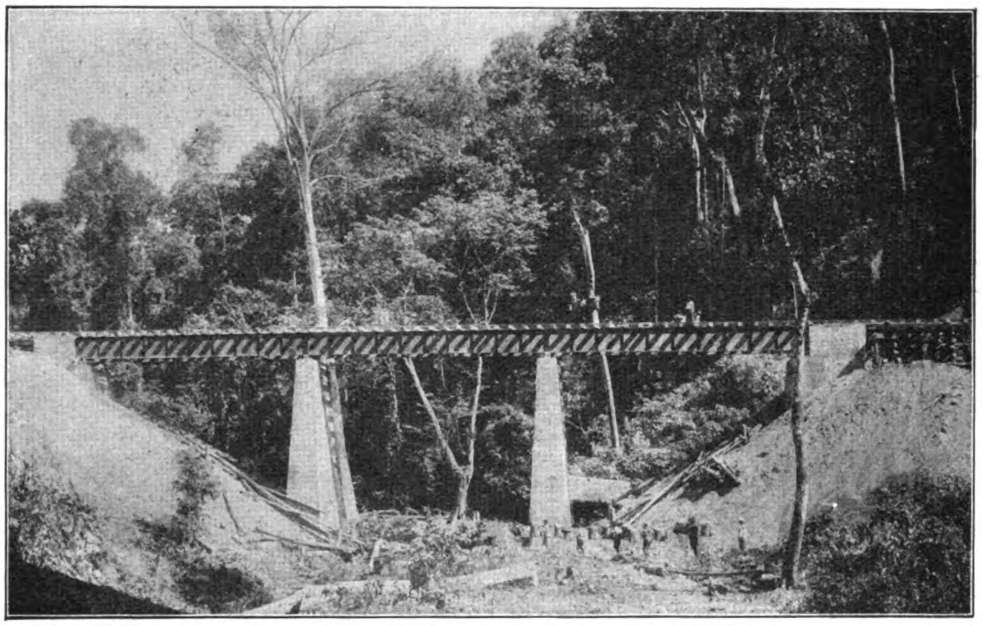
The Kao Plung pass at Km 425.8 was pierced by a tunnel 362 m long 70 m below the pass and 182 m above Formation Level at Utaradit (Tha Sao). The incline leading to the pass has a maximum grade of 20% whereas the sharpest curves have a radius of 200 m.

ROYAL SIAMESE RAILWAYS—THE TOWN OF SAWANKALOPE ON THE MEH TOM

The cost of the line amounted to Ticals 3,846,534.

The cost per kilometer was Ticals 99,651, and represents the maximum on record for the Siamese State Railways, owing to the aforementioned technical difficulties.

Tracing and surveying.—The Ticals 161,297 spent for this item include the various survey works as far back as 1900 in search of a suitable route for the Northern Line at a time when it was not yet decided whether the Railway should be laid through Raheng or Utaradit, Especially, this amount includes the survey of a route over the Muang Li pass between the Meh Wang and the Meh Ping, a route from Sawankaloke along the Meh Yom to Muang Long, detailed surveys of the crossing of the range dividing the Meh Yom from the Meh Wang over the Muang Long and the Pang Buei passes.



ROYAL SIAMESE RAILWAYS—BRIDGE OF THREE 13 METRE SPANS AT KM. 419.9 OF THE NORTHERN LINE

Earth and Rockworks.—2,697,547 cbm. of earth and rock had to be turned and blasted, the total outlay amounting to Ticals 1,591,681 at Ticals, 0.94 per cbm.

Bridges and Culverts. — Total amount spent Ticals 362,549 at a cost of Ticals 9,392 per Km. Owing to the expensiveness of the means of transport great care has been taken to reduce bridging to the utmost limit. A number of gaps have been filled allowing the water either to percolate through the bank by drains made of stonepacking or to overflow the bank by rail openings. In many cases no outlet whatever for the water was provided for, owing to the rocky nature of the soil used for the construction of the embankments.

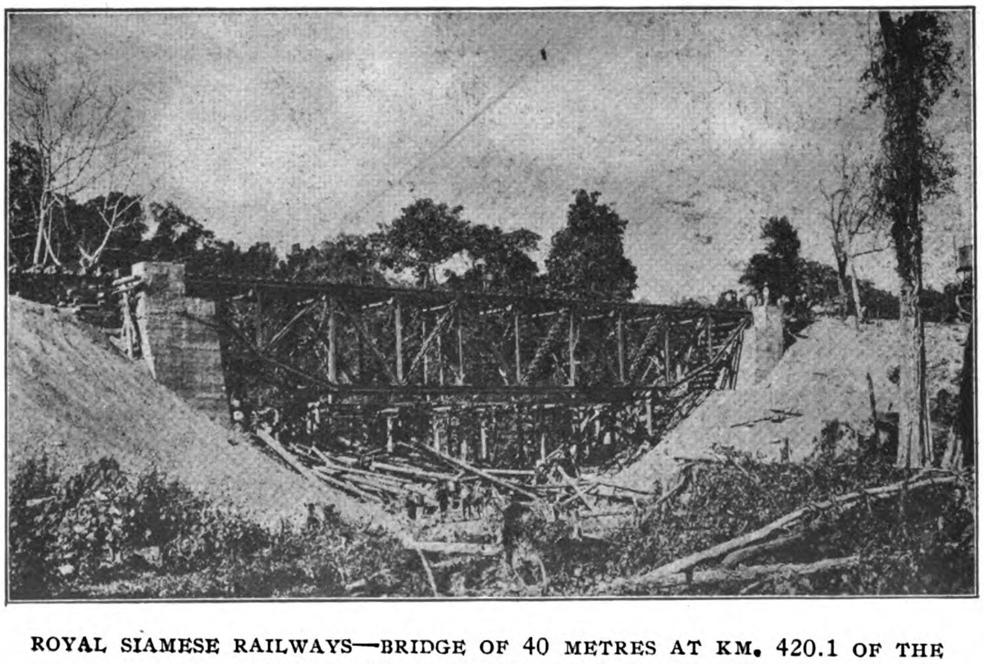
Tunnels.—As already mentioned 2 tunnels had to be bored of 109 m and 362 m respectively in length. Total cost Ticals 347,837; cost per running meter Ticals 739.

The smaller tunnel has been lined with bricks and the pass tunnel with concrete owing to its being more wet. Iron centerings were made use of for the lining work and afforded great facility.

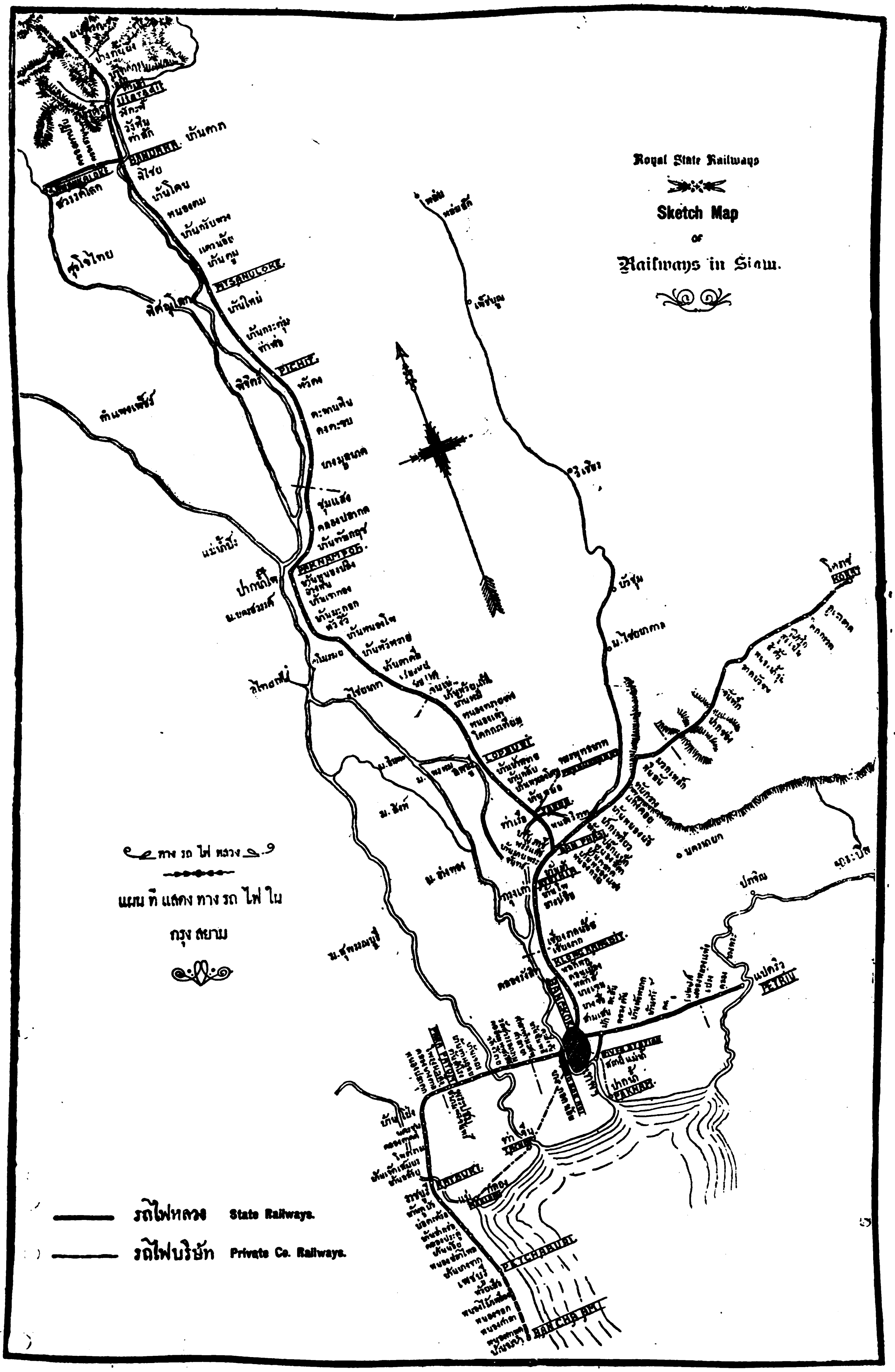
Permanent way.—The usual type of the broad gauge Railways was used.

Stations.—There being only a few stations, namely, Ban Dan, Pang Ton Pung and Meh Puak, which have been provided with ordinary wooden structures for the station service and the housing of the officials, the total amount of Ticals 60,311 seems rather high. This is due to the rule to account under this item the quarters of the construction staff; and in this special case the amount includes also all quarters

ROYAL SIAMESE RAILWAYS—THE BRIDGE OVER THE MEHNAM AT KM. 366 OF THE NORTHERN LINE, UNDER CONSTRUCTION. THIS BRIDGE HAS SPANS OF 80×100×80 METRES



ROYAL SIAMESE RAILWAYS—BRIDGE OF 40 METRES AT KM. 420.1 OF THE NORTHERN LINE, UNDER CONSTRUCTION


Royal State Railways
Sketch Map
of
Railways in Siam.
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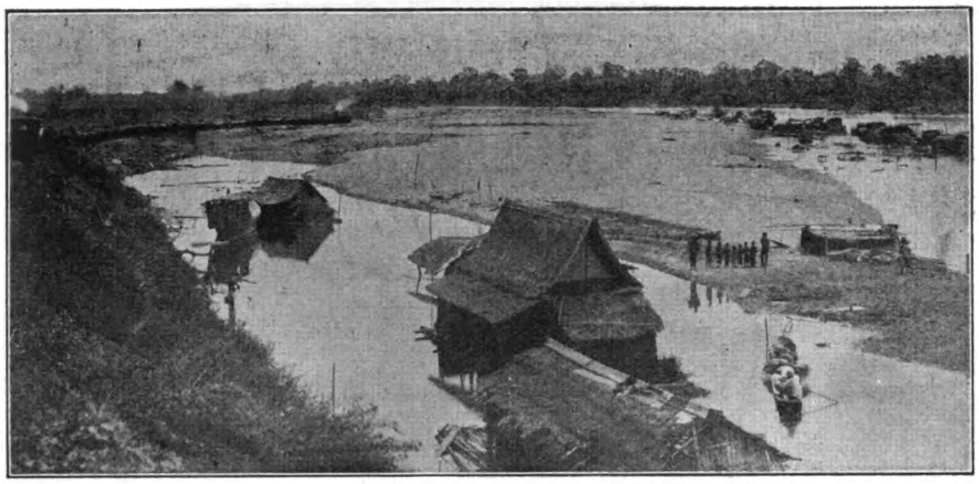
กรุง สยาม
รถไฟหลวง State Railways.
รถไฟบริษัท Private Co. Railways.



ROYAL SIAMESE RAILWAYS—SIDING AT THE MEHNAM FOR THE SUPPLY OF SAND BALLAST AT KM. 340 OF THE NORTHERN LINE

built as far as Muang Long, owing to the discontinuation of the works beyond Meh Puak.

Rolling Stock.—No special rolling stock having been purchased for this line the amount of Ticals 185,701 appearing under this item forms a share of the cost of Rolling Stock for the lines from Pitsanuloke to Utaradit and from Ban Dara to Sawankaloke. Besides this item includes to expenses for the repairs and overhauling of the rolling stock used for construction purposes.

The Administration expenses. — With Ticals 324,973, which equals 8.5% of the total expenses, the average of 7.9% is somewhat exceeded. This is due to this amount including the salaries of the engineering staff beyond Meh Puak before discontinuation of the works and further owing to the compensations which had to be paid in dissolving the agreements of the staff.

ROYAL SIAMESE RAILWAYS—THE BRIDGE OVER THE MEHNAM AT KM. 366 OF THE NORTHERN LINE, UNDER CONSTRUCTION

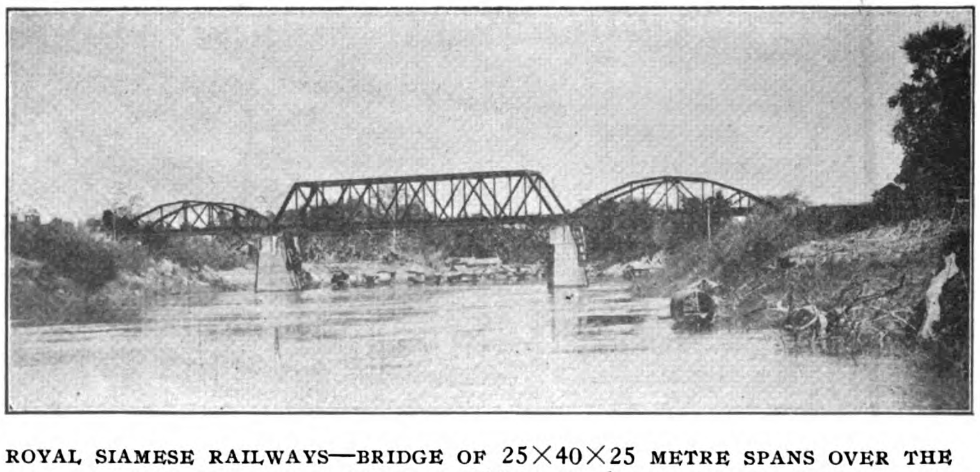
Prospects of the line.—Leaving the Menam plain at Utaradit and entering the hill districts this section of the Railway opens up a market the economical conditions of which greatly differ from those of the places hitherto traversed by the Northern Line. Though the navigable facilities as far as Utaradit on the Menam Yai are comparatively poor they are by far superior to the means of transport available outside the reach of waterways. The usual means of transport are carriers and pack animals. The rate of transport is consequently enormous and rarely or never less than 1 Tical per tkm., whereas the Railway rate is only a fraction of $\frac{1}{10}$ to $\frac{1}{100}$. It is clear that only goods of high value can stand such high transport rates. The introduction of the Railway creates therefore more or less a revolution of the existing trade relations. The day the traffic was opened to Meh Puak the trail leading over the Kao Plung pass to to Utaradit was abandoned by the caravans leaving the field entirely to the Railway. The monetary effect, however, is only small at the beginning, as the trade with goods of a bulky nature and inferior value with which the Railway has to reckon, has first to be built up. Besides the Railway only touches one of the places of consumption *i.e.*, the plain of Prae.

The full benefit of the Railway will only be reaped when same is carried to the places, which now depend solely on caravans, *i.e.*, to Prae, Muang Ngao, Chiengrai and Chiengsen.

The trade at Meh Puak Station since its opening to traffic, that is for ten months, amounted to Ticals 64,875, of which Ticals 23,667 represents receipts from passenger traffic. A satisfactory increase both in the passenger and goods traffic was shown in each successive month that the line was open.

Extension.—On the 26th June, 1911, the Royal Railway Department received instructions to shift the temporary Railway terminus of the Northern Line for about 5 Km. farther north to a place called Dene Chai, for which purpose Ticals 265,000 were allowed. This decision has been given in consideration of the various advantages which Dene Chai will offer against Meh Puak. Whereas the latter place is still lying somewhat in the hills on the incline leading to the Kao Plung pass, Dene Chai is situated at the foot of the hills on the plain proper, thus being of easier access. A cart-road connecting this station with the road system of the province of Prae is under construction. As soon as this road is completed traffic will be opened as far as Dene Chai.

On 26th January, 1912, instructions were issued to the Royal Railway Department to continue the construction of the Northern Line as far as Chiengmai. The distance to that place from Dene Chai is 222 Km. The cost has been estimated at Ticals 17,000,000 and works have been started forthwith.



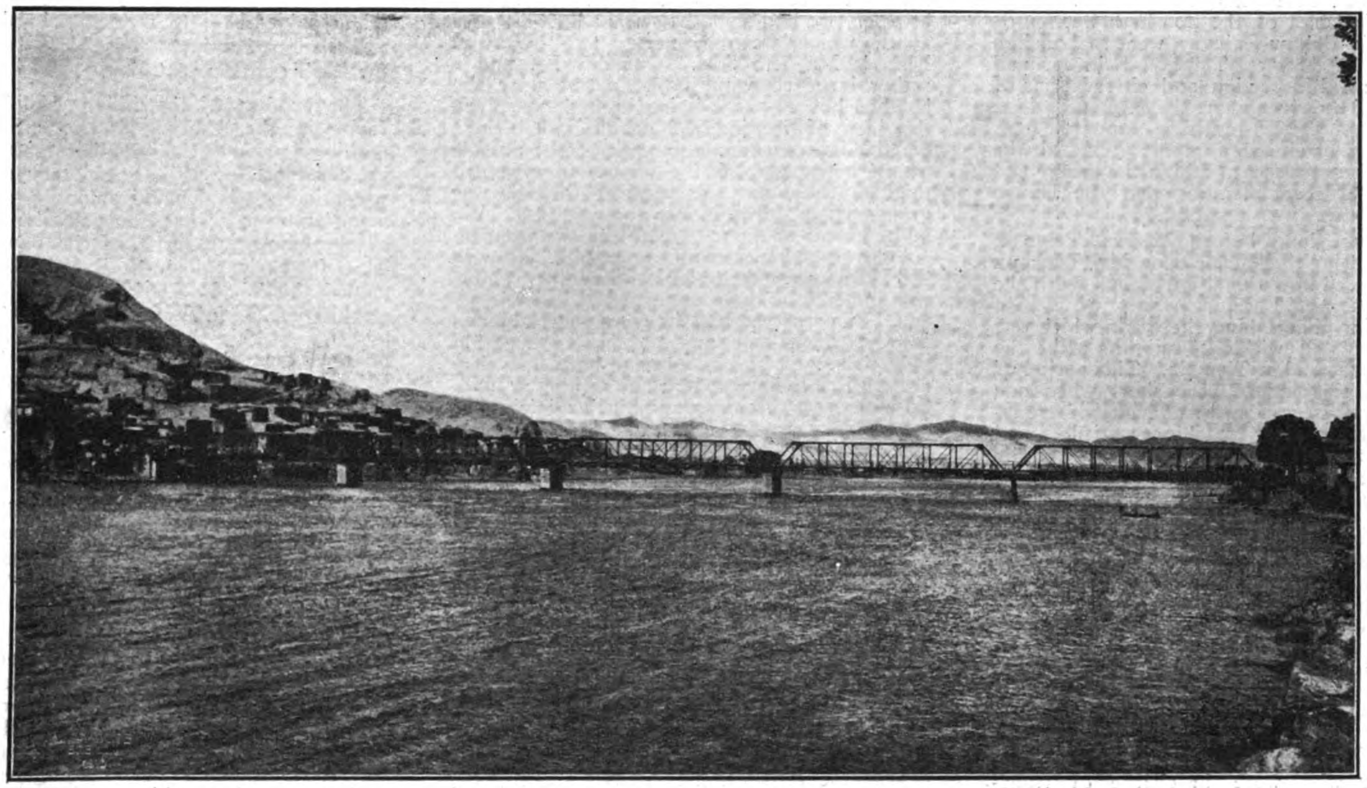
ROYAL SIAMESE RAILWAYS—BRIDGE OF 25×40×25 METRE SPANS OVER THE QUASO NOI RIVER AT KM. 314 OF THE NORTHERN LINE

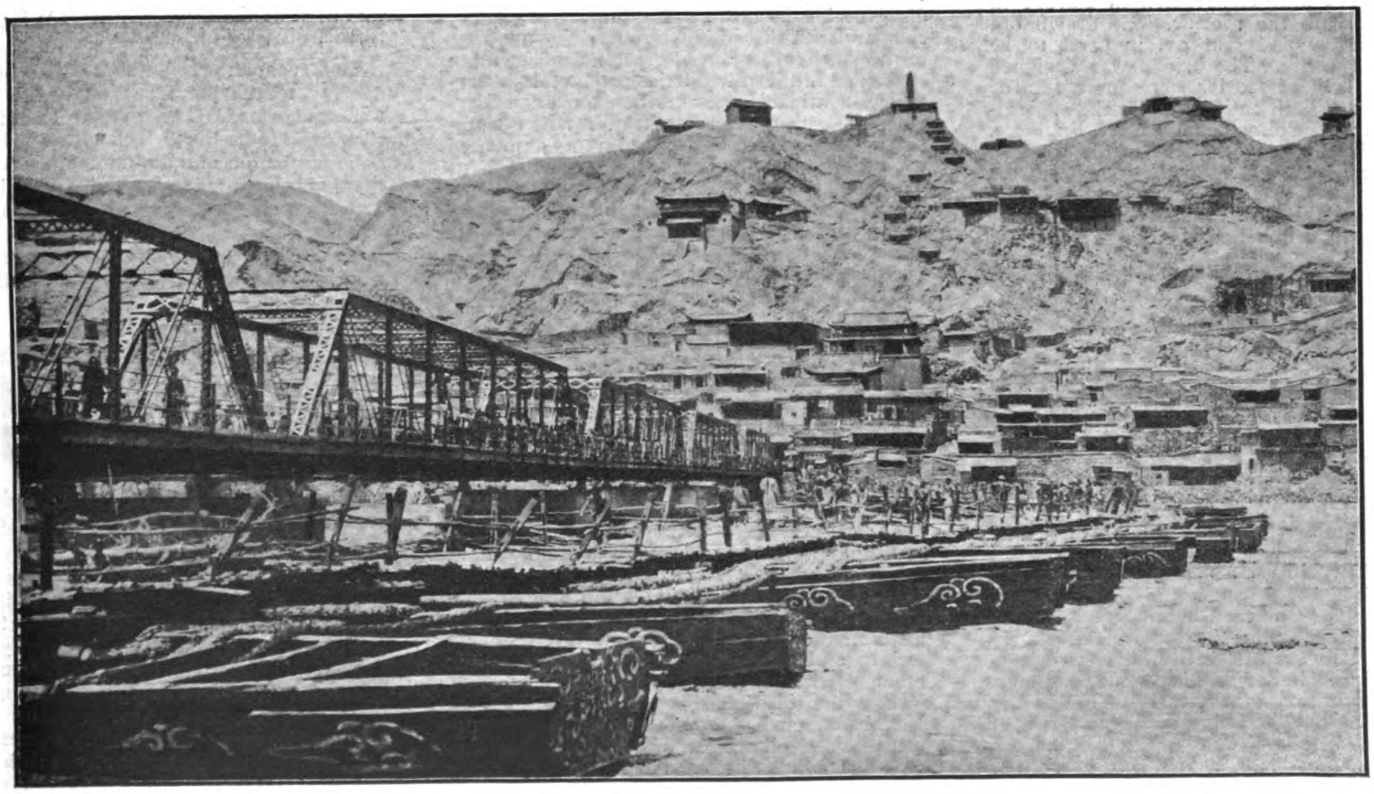
HIGHWAY BRIDGE ACROSS THE YELLOW RIVER AT LANCHOUFU, KANSU

A REMARKABLE FEAT OF TRANSPORTATION

Amongst the most important engineering works so far accomplished in the Far East the Lanchoufu Bridge is one which should not escape the notice of those who are interested in such enterprises.

It may be noted that Lanchoufu, being the capital of Kansu, is the centre of trade of that Province. The river, on whose bank the city of Lanchou stands, was formerly spanned by





TWO VIEWS OF THE LANCHOWFU HIGHWAY BRIDGE

a bridge of 24 floating pontoons, as seen in one of the illustrations accompanying this article. How much it cut off the traffic and interrupted the development of trade and industries is obvious. But it was not till 1906 that this fact attracted the serious attention of the Provincial Authorities and that an iron bridge was proposed to be built in place of the pontoons.

After certain negotiations held between the Agent specially deputed by the Viceroy of Kansu and Messrs. Telge & Schröter at Tientsin, a preliminary agreement was signed by the latter firm, which was to undertake the construction of the bridge subject to the decision of the Engineer to be sent to make an inspection of the site.

Mr. W. R. T. Tuckey, B.E., M.I.C.E., now Engineer-in-Chief of the Southern Section of the Tientsin-Pukow Railway, went to Lanchou on behalf of Messrs. Telge & Schröter and made a careful inspection and observations of that part of the river where the proposed bridge was to cross. On his return in January, 1907, Mr. Tuckey produced a report giving all the information necessary to design the bridge and concluded by recommending that the bridge should be built.

It was not long before Messrs. Telge & Schröter, basing their plans upon Mr. Tuckey's report, entered into a final agreement with the Commissioner of Foreign Affairs of Kansu Province for undertaking the work, which was to be completed within 18 months after the arrival of material in Tientsin. This period of 18 months was indeed very short when one takes into consideration the difficulty of transporting all the plant, machinery, girders and materials, as well as the skilled workmen, by native carts—the maximum load of each cart being only 1,200 catties or 1,000 lbs.—for the most part of the 1,000 miles journey from Tientsin to Lanchoufu. In fact, this difficulty in transportation alone made the work worthy of note, as it required much skilful management and was of a nature that has been seldom experienced in engineering work in the Far East, or at least in North China.

In the latter part of 1907 active work was commenced, and in spite of the great difficulties of transportation, the whole bridge was completed within the time stipulated in the agreement. Great credit is due to the Kansu officials who were in charge of transport.

The girders were constructed in Europe in accordance with the specifications drawn out by Mr. Tuckey and sent out in parts to be erected at the site. The bridge was designed to carry a load of 120 lbs. per square foot of floor area and built entirely under the supervision of Mr. R. Coltman, an expert Engineer. It is needless to say that the whole work is of a first class quality, as in the agreement the firm of Messrs. Telge & Schröter is bound to guarantee the safety of the bridge for 80 years after its completion.

The following gives a brief description of the bridge:—

The Bridge is a Steel Lattice Girder Highway Bridge. The total length, between abutments, is 760 feet, or 230 metres; made up of five spans of 153 feet each; the width is 8 metres, a carriage-way 6 metres wide, with a foot-path, one metre wide on each side.

The underside of the girders is 12 feet above the "Normal" water level. The bed of the river is composed of gravel and boulders, overlying rock, conglomerate and clay at varying depths.

The substructure consists of four concrete piers, sunk by the Pneumatic process. Several bridges on the Chinese Government Railways, Peking-Mukden Line, (formerly known as Imperial Railways of North China) were c nstructed in a similar manner some years ago. A full description of the carrying out of two of these works, with plans, is given in a paper read before the Institution of Civil Engineers, England, in 1904-5, and is published in Volume CLX of their *Minutes of Proceedings* under the heading "Railway Construction in North China."

THE TALKING COCOANUT

"While in the Government employ in the Philippines," says Sanford Jones, Manager at North Yakima, "I was stationed on the Island of Basilan, which is a small island in the Sulu Archipelago. The natives of this island were so uncivilized that they did not even know the value of money, and of course had never heard of a telephone. We frequently had them entertain us with their native dances, and in turn would fill them with wonder and awe with a phonograph which we had in our outfit. We found it necessary to put up a telephone line between two buildings that were a little distance apart, which we did, using two Western Electric Magneto Sets. One day I found a rather large cocoanut under a tree near the bamboo hut we were living in, and conceived the idea of making a cocoanut talk. So I emptied its contents and hung it on the outside of the house opposite the phone, so arranged that we could put the receiver through the grass wall and drop it into the cocoanut. We invited some of the natives to see the wonderful cocoanut that we could make talk, and with the aid of an interpreter at the other phone who understood their language, we had a lot of fun. Some of the natives were so frightened they left the village, and one day a delegation of natives came and asked us to burn it, as they did not like to have so uncanny a thing around. So with great ceremony and much rejoicing we consigned it to the flames, and to this day I suppose they are telling their children about the cocoanut that could talk."

PEPPERMINT OIL INDUSTRY IN JAPAN

The following particulars regarding the Japanese peppermint oil industry have been received from H.M. Commercial Attache at Yokohama (Mr. E. F. Crowe):—

Japanese peppermint is remarkable for the large proportion of menthol crystals it contains. The dementholised peppermint oil of Japan is disagreeable in taste and odour, and cannot compare with that of other countries, but owing to the large percentage of crystallisable menthol contained in the raw oil the product is nevertheless a valuable one and the export considerable. The trade is remarkable for its fluctuations. The exports of menthol in 1911 amounted to 151,538 lbs,, valued at £98,300, and of peppermint oil to 229,800 lbs., valued at £63,900. The total crop is a small one, and as the demand is not very large, it often happens that the farmers, tempted by the good prices obtained in the preceding year, rush to extend their acreage under this crop, with disastrous results.

In 1911 the farmers realised very good prices for their peppermint leaves, and under ordinary circumstances it is certain that there would have been an excessive supply of peppermint planted this year, but owing to the high prices obtainable for rice, farmers as a general rule preferred to plant it instead of peppermint. The result is that though this year's crop of the latter is larger than that of last year, the price has kept very high because the demand for menthol in Europe—for reasons unknown in Japan—seems to have increased.

In the Odashitsuki, Okujoto and Bingo districts there are Peppermint Guilds, which examine the oil and give a certificate as to its weight and purity. As regards oil from the other districts the refiner has to take his chance. When the oil has been dementholised in Yokohama or Kobe, as the case may be, the menthol and oil are put up separately in tins of 5 lbs. each, 12 tins to a case, and are ready for export. In Japan itself the consumption of menthol is not very large, roughly about 15,000 lbs.

LUMBER IN THE PHILIPPINES

Two million board feet of lumber monthly is the splendid record which will be made by the Insular Lumber Company, starting with the new year, and this compares favorably with the output of many of the large mills of the United States, says the *Manila Times* of December 20, and continues:—Officials of the company stated yesterday that this, together with the fact that they have a new fleet of vessels for the transportation of the product, would more than enable them to meet the local demand, and also to continue their large shipments to the Pacific coast and China.

The product of the mills is rapidly gaining favor in the United States, especially as nothing but first class lumber is shipped, the greater part of this being quarter sawed, which is in great demand among the furniture manufacturers. The transportation facilities of the company consist of the powerful tug boat, formerly called the Robert K., and now named the W. P. Clark, and six large new steel barges, with 32 foot double hatches. In addition to this the company has a steamer on the Himagahan river, upon which the mill is located.

The last report of the inspector of the bureau of forestry, dealing with the inspection made in August, has just been received, and is most complimentary to the company and its system. The report speaks of the excellent provision made for the employes of the company, who live in a model city, with a market which brings the people from miles around, to the number of three or four thousand weekly.

A cockpit is run, under the supervision of the company's officials, excellent water is piped through the town, and medical services are furnished free. The inspector speaks also of the high grade of lumber turned out, and of the excellent and complete equipment of the mill, as regards machinery. The logging methods are spoken highly of, as well as the operation of the railroad, which is now hauling from a distance of nine miles.

The typhoon of October did considerable damage to the plant, although the new mill was not harmed. The water in the Himagahan river rose some thirty feet within a few hours, flooding the old mill and sweeping down all of the lumber stored near the river bank, and damaging the houses on the lower level. The monetary damage only amounted to about P.10,000, however, which was fortunate, considering the value of the plant, and the damage done elsewhere.

Labor conditions are excellent, the firm employing more than seven hundred Filipinos, and so well satisfied are the people of the district with the treatment afforded, that it would be possible to double the force within a few days, if necessary. Eighteen Americans are employed at the plant, all living in model residences, with electric light and running water, and having the advantage of an ice plant and cold storage.

Heretofore the local demand has taken the greater part of the company's output, but with the increased production, the export business will receive more attention, especially since the use of Philippine woods is becoming more general in the United States. Freight rates, while not low, are satisfactory, and lumber is a desirable cargo among ship owners. All in all, the future looks pretty bright for the company, and the prospect should please the party of directors, who are now en route to the islands.

FAR EASTERN RAILWAYS

CHINA

OFFICIAL RETURNS OF REVENUE

The following revenue returns of the railways of China, which are official, will be found of interest:—

Tientsin-Pukow Railway

(*Northern Section*)

Receipts for the first ten days of November, 1912.

Passengers............$54,851.155
Goods $34,516. 50

Total $89,367.655

For the second ten days of November, 1912.

Passengers............$62,196.365
Goods 41,182. 77

Total $103,379,135

For the third ten days of November, 1912.

Passengers............$60,577.395
Goods 45,003. 68

Total $105,581.075

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended December 14, 1912 are issued by the Shanghai-Nanking Railway:—

For the Week.

Year.	Passengers.	Goods and Sundries earnings	Total
	$	$	$
1912....	41,608	9,758	51,366
1911....	58,790	6,825	65,615
Increase.	—	2,933	—
Decrease.	17,182	—	14,249

For fifty weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1912....	2,149,199	396,656	2,545,855
1911....	1,822,549	299,311	2,121,860
Increase.	326,650	97,345	423,995
Decrease	—	—	—

The week ended December 21, 1912:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1912....	38,567	8,200	46,767
1911....	52,304	6,810	59,114
Increase.	—	1,390	—
Decrease.	13,737	—	12,347

For fifty-one weeks.

Year.	Passengers.	Good and Sundries	Total
	$	$	$
1912....	2,187,766	404,856	2,592,622
1911....	1,874,853	306,121	2,180,974
Increase.	312,913	98,735	411,648
Decrease	—	—	—

The week ended December 28th, 1912:—

For the week.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1912....	40,852	6,312	47,164
1911....	54,719	6,083	60,802
Increase.	—	229	—
Decrease	13,867	—	13,638

For Fifty-two weeks.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1912....	2,228,618	411,168	2,639,786
1911....	1,929,572	312,204	2,241,776
Increase.	299,046	98,964	398,010
Decrease	—	—	—

The week ended January 3, 1913:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total for the week.
1912*..	48,266	9,486	57,752
1911†..	52,407	4,483	56,890
Increase.	—	5,003	862
Decrease	4,141	—	—

For fifty-three weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912*..	2,276,884	420,654	2,697,538
1911†..	1,981,979	316,687	2,298,666
Increase	294,905	103,967	398,872
Decrease	—	—	—

The week ended January 11:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	49,479	10,531	60,010
1912....	52,136	5,207	57,343
Increase.	—	5,324	2,667
Decrease	2,657	—	—

For one and a half weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	78,176	15,833	94,009
1912....	96,432	8,568	105,000
Increase.	—	7,265	—
Decrease	18,256	—	10,991

The week ended January 18:—

For the Week.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	45,907	9,557	55,464
1912....	48,964	4,453	53,417
Increase.	—	5,104	2,047
Decrease	3,057	—	—

For two weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	124,083	25,390	149,473
1912....	145,396	13,021	158,417
Increase.	—	12,369	—
Decrease	21,313	—	8,944

Summarized Statement

			Total
Peking-Mukden......	Nov. 1912	$	1,590,327. 60
Tientsin-Pukow (Northern & Southern Sections)	„ „	$	524,678.865
Peking-Hankow	Nov. 1912	$	1,328,745. 01
Tao-Ching Hongping Taels 39,957.85 c. @ 7.10	„ „	$	56,278. 70
Tcheng-Tai	„ „	$	249,631. 97
Peking-Kalgan......	Dec. „	$	200,157.815
Kalgan Extension ..	„ „	$	31,479. 30
Pienlo	Oct. „	$	82,572. 70
Canton-Kowloon	Sept. „	$	47,660. 40
Shanghai-Nanking ..	53 weeks	$	2,697,538

* These figures are for the four last days in December, and the first three days in January.

† These figures are for the six last days in December, and the first day in January.

Tungyang-Mingkuo Railway.—The *Eastern Times* reports:—There is a scheme to build a railway between Tangyanghsien, Kiangsu, and Mingkuo-fu, Anhwei, extending 115 miles at the cost of $6,000,000. The rich people of Tangyang, Piaoyang, Kintan, Chienping and Hsuancheng have proposed to subscribe $2,000,000 towards the capital and they have asked the Railway Administration under Dr. Sun Yat-sen at Shanghai to rise $4,000,000. However the Railway Administration has not decided on the matter and probably it will be some time yet before it is carried out.

Nanchang Pinghsiang Railway.—It is reported by the *Eastern Times* that the Tutuh of Kiangsi has received the following telegram from the Department of Communications:—In planning the important railway lines in China it is found that in Kiangsi there is no line to facilitate communications while there are rich products in that province and thus people are not enjoying the benefit of having such rich products. The railway from Kiukiang to Nanchang is only a short line from Nanchang to the Yangtsze and unless the line is extended beyond Nanchang it is not of much use. At present in building the Hankow-Canton Railway there are people who propose to build a line between Nanchang and Pinghsiang so as to connect with the line between Pinghsiang and Chuchow on the one hand and with that of Nanchang and Kiukiang on the other so as to develop the industries and trade of the province. A certain British syndicate has proposed to give a loan for the said line between Nanchang and Pinghsiang and at this moment when China is simply depending on foreign capital the loan may be negotiated. The Tutuh is asked to investigate the matter.

The Ningpo Railway.—A Ningpo correspondent wrote to the *North-China Daily News* on December 23 as follows:—With a haste contrasting strangely with previous dilatoriness, the Ningpo end of the railway, which is to connect this port with Hangchow and Shanghai, has been opened to traffic. The lines have only as yet been laid to a distance of twenty or thirty *li*, and the station at the Ningpo end consists of little more than a raised platform and a galvanized iron shelter, but the formal opening was arranged to take place on Sunday last. There was a large gathering of local officials and gentry, with companies of students from the schools, and after a number of complimentary speeches, the first passenger train was occupied by the guests and ran its course. Complimentary tickets extending over three days have been issued in large numbers. There is no likelihood of any large amount of passenger traffic on the present short distance, but it is evidently expected that the demonstration of a real beginning may help to replenish the funds which are still sadly lacking.

Burma-Szechuan Railway.—Great Britain, with a view to establishing connection between Burma and Chengtu, the capital of Szechuan Province, by extending the Burmese Railway line, is now constructing a road on the frontier between Yunnan and Burma.

Canton-Huichow Railway.—The Governor of Kwangtung Province is contemplating to borrow a loan of $10,000,000 from America and another loan of $15,000,000 from Great Britain in connection with the proposed Canton-Huichow Railway.

Pukow-Sisyangchow Railway. — Shen Yun-pei, ex-Vice-Minister of Communications, has been appointed Director-General of the Pukow-Sisyangchow Railway, and he will consult with the Peking Syndicate about the flotation of the loan, but he has not yet decided whether the clauses of the agreement will follow the example of the Shanghai-Nanking or Tientsin-Pukow Railways (*Chinese Report*).

JAPAN

Railway Development.—According to the investigations of the Japan Railway Board up to the end of December last the total capital of private steam railways, light railways, and tramways, that applied for charters or were granted charters for construction during last year is represented to aggregate 296,009,336 yen, their total length reaching 6,200.57 miles.

The particulars are as follows:—

LIGHT RAILWAYS

Newly applied for charters:

Number	Mileage	Capital Yen
120	1,688.26	95,676,727
Charters granted:		
313	2,928.44	138,369,150

TRAMWAYS

Newly applied for charter:		
110	1,079.87	14,766,959
Charters granted:		
2	11.10	60,000

PRIVATE STEAM RAILWAYS

Newly applied for charters:		
2	91.40	10,300,000
Charters granted:		
11	400.80	36,400,500

Included in the above are seven steam railways and light railways with a total length of 109 miles 67 chains and capitalized at 4,505,000 yen, which were granted charters in accordance with the provisions of the Light Railway Law.

They are as follows:

Name	Mileage m. c.	Capital Yen
Higo Railway	23.40	1,000,000
Aibi Railway	9.60	350,000
Seto Electric Railway	2.63	75,000
Tono Railway	10.40	450,000
Aichi Electric Railway	8.64	1,500,000
Nobi Electric Railway	31.40	540,000
Shunan Electric Railway	18.00	4,575,000
Total	109.67	4,575,000

Extensions and Repairs.—Baron Goto, the Japan Minister of Communications, is quoted in the *Asahi* on the subject of the postponement of the extensions to and repair of the railways. He is stated to have said that in view of the faulty administration of the preceding Cabinet, he would be obliged to observe a policy of curtailment in the railway works for the next fiscal year, as there was no prospect of his being able to raise the required foreign loan, though something might be done to relieve the present situation if the Balkan question were brought to an early settlement. At any rate he must frame his Budget on the basis of funds that are sure to flow into his Department. He meant to get an advance of fifteen million *yen* from the Deposits Account of the Finance Department, which, added to an equal amount of profits from the existing railways, would make an available fund of thirty million *yen* to be spent upon new lines and repairs. The original estimates for 1913-1914 were 50,200,000 *yen*, of which 200,000 *yen* were to be defrayed out of the Deposits Account and the balance raised by a public loan. In the event of Baron Goto's estimates being carried out, that is to say thirty million *yen* being devoted to the work of construction and repairs, continues the *Asahi*, supposing that the work postponed from last fiscal year amounted to ten million *yen* and will consume the amount out of the funds provided for the next fiscal year, there will remain only twenty million *yen* to be applied for works that were originally calculated to require 50,200,000 *yen*. It comes to this, therefore, that work will be carried on only on such lines as are nearly completed and improvements will be restricted to such as are of absolute necessity. Suspension, rather than postponement, is the word fitted to describe the present situation of railway work in this country.

KOREA

Korean Railway Extension.—Mr. G. Oya, chief of the Korean Railway Board has made the following statement concerning the railways in Korea. The appropriation asked for the Railways in Korea for the coming fiscal year is yen 8,500,000. Out of the above estimates some will be spent for the extension of the line between Seoul and Wonsan, and also for the Honan line, while there will be some asked for the reconstruction of the iron bridge over the Hangku River. The mileage of the Seoul-Wonsan line is 135 miles of which 60 miles from Seoul to Teolwan is already open for traffic. Further on, there is a line of 15 miles reaching the peak of Honpulrian on which there is a construction engine ahead at work. Twenty miles from Wonsan there is a line now completed and there are fourteen tunnels and twenty iron bridges on the line beyond Honpulrian. The completion of the whole line is expected in 1915. In the Honan railway Tadeon and Hoppo and 85 miles from Tadeon to Honan, and the branch line to Unsan, 15 miles in extent, are already open for traffic. The line between Honan and Hoppo will be completed next year. The reconstruction of the Hangku iron bridge will be started next year.

Tongnai Light Railway.—On July 2 last the Korea Gas Co. of Fusan, owners of the Fusanchin-Tongnai light railway, obtained from the Korean Railway authorities permission to extend the line to Taiku via Ulsan and Kyongju and also to construct a branch line from Kyongju to Yongil Bay, the aggregate length of the lines to be newly laid exceeding 100 miles. Mr. Udaguchi, President of the company, subsequently announced that the construction work would be undertaken next spring. It is now stated that it will be difficult for the company to undertake the work at least for the time being. The company is capitalized at three million *yen* and for several years past it has been unable to pay any dividend to its shareholders. This year, however, a small dividend was paid, but the company is far from possessing any large amount of surplus money. Under the circumstances, the undertaking of the new enterprise above referred to will entail an increase in the capital of the company, besides the non-payment of dividend for some years to come. Many shareholders of the company therefore object to the work being undertaken at present.

Yalu Railway Bridge.—The Yalu Railway Bridge was to be lighted by electricity from December, 1912. The Bridge was to be divided into two lighting sections at the middle. The lighting of the northern half will be undertaken by the South Manchuria Railway, and the southern half by the Chosen Railway.

SIBERIA

The Amur Railway.—From a report on the Russian Budget for the year 1912 and the Provisional Gross Estimates for the year 1913 by Mr. Hugh O'Beirne, Councillor of His Majesty's Embassy at St. Petersburg, it appears that £600,000 were assigned for the purpose of rebuilding certain portions of the Trans-Siberian Railway in 1912. The total cost of the work, which is nearing completion, is now put at £7,700,000. The sum for duplicating the track of the Trans-Siberian Railway is estimated at £8,900,000. Up to the end of 1911 £4,400,000 had been assigned and £2,200,000 were assigned in 1912. The estimated cost of the Amur Railway in £22,900,000. Up to the end of 1911 £7,500,000 had been assigned and £7,700,000 were assigned in the present year.

MANCHURIA

South Manchuria Railway.—Some of the fresh enterprises originally planned to be taken in hand during the present fiscal year by the South Manchuria Railway Company have been put off to the next fiscal year. In consequence, a curtailment of about Y2,000,000 has been effected in the capital expenditure set aside for the present fiscal year. It is expected that a reduction by about an equal amount will be made in the capital expenditure for the next fiscal year, making the amount under that item for actual defrayment about Y14,000,000, which will be invested principally in the under-mentioned undertakings:—

Improvement of the Main Line and the Mukden-Antung Line; construction of passenger and goods cars; prosecution of Dairen Harbour Works; widening of the entrance to the Kawasaki Dock; foundation work for the new premises of the Central Laboratory; establishment of an agricultural experimental station at Kungchuling; construction of transfer arrangements between steamer and wharf at Antung; construction of new warehouses at Yingkou, &c.

The management of the South Manchuria Railway is reported to have decided to construct a third quay to the west of the Main (West) Quay at an estimated cost of Y3,000,000. According to the present plan, the new quay is to start at 900 ft. west of the Main Quay and is to project outward 1,950 ft. in a parallel line to the other. It will have a width of 400 ft. The shore line intervening between the Main Quay and the new quay, 900 ft. long, will be also included in the new quay line, making its total length 5,200 ft., capable of berthing twelve vessels. The aggregate berthing capacity of this port, when the new quay is completed, will reach about thirty vessels. The central base between the Main Quay and the proposed new one will have 25 ft. of water, and the farthest sections of the new quay 33 ft. of water, in both cases at low tide. The construction of the new quay, which means the creation of another Basin at the west of the existing one, will be put in hand early in the next fiscal year, and will be completed in about five years.

The receipts of the South Manchuria Railway Co. during Dec. 1912, amounted to Y2,618,722.38. Compared with those of the same month of the previous year the returns show an increase of Y317,680.44.

Chinese Eastern Railway.—Despite all adverse circumstances, such as the pneumonic plague outbreak, the revolution, strained diplomatic relations between China and Russia, etc., the business conditions of the Chinese Eastern Railway are showing improvement from year to year. During 1911, the total amount of general cargo handled by the Railway Company reached 75,000,000 poods, which was an increase of 17,000,000 poods in comparison with the previous year. In the above mentioned figures are contained the following cereals:—

Beans	18,000,000 poods
Wheat	7,800,000 „

Flour	3,200,000	poods
Various Seeds	1,200,000	"
Kaoliang	1,000,000	"
Bean Cake	1,000,000	"
Bran	900,000	"
Millet	800,000	"
Oats	700,000	"
Barley	750,000	"
Buckwheat	47,000	"
Other Cereals	450,000	"

As the area of agricultural land in North Manchuria is considered to have been considerably expanded during this year, farming products have no doubt proportionately increased, so that the return of railway receipts for 1912 will eclipse that of 1911.

The Pensihu Railway.—The Metei Company of Manchuria has raised the sum of 1,700,000 taels towards the construction of the Pensihu Railway, which is intended primarily to develop the Chinese coal and iron industries. The plans are for the adoption of standard gauge and for the construction of nine railway stations.

The Aigun-Wenchow Railway.—Tutuh Soon Hsiao-lien of Heilungkiang has wired to Peking that Russia has despatched over twenty Russia surveyors to operate on the proposed Aigun-Wenchow Railway and also sent a number of engineers from the Chinese Eastern Railway Co. They declared that they will freely construct that line following in the steps of the Japanese construction of the Antung-Mukden Railway.—(*Chinese Report*).

TRAMWAYS

Shanghai Tramways.—The returns of the Shanghai Tramways (Foreign Settlement) for 12 months ended 31st December, 1912, are as under:—

	1912.	1911.
Effective Receipts (after deducting loss by exchange)	$797,832.04	$636,363.16
Passengers carried ..	40,734,233	27,257,250
Car miles run..	2,747,088	2,241,113

The loss by exchange of subsidiary coinage for the year 1912 was $239,374.78 equal to 24.55% of the gross cash collected on the cars as compared with $168,848.31 equal to 22.93% for the year 1911.

For the week ended 1st January, 1913:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$14,455.20	$14,496.83
Passengers carried ..	704,124	699,477
Car miles run..	47,974	51,175

The loss by exchange of subsidiary coinage for the week was equal to 21.97% of the gross cash collected on the cars as compared with 24.22% for the corresponding week last year.

For the week ended 8th January:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$16,315.35	$14,403.10
Passengers carried ..	789,872	710,991
Car miles run..	51,363	51,299

The loss by exchange of subsidiary coinage for the week was equal to 20.34% of the gross cash collected on the cars as compared with 24.75% for the corresponding week last year.

For the week ended 15th January:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$14,733.20	$14,144 56
Passengers carried ..	714,639	695,753
Car miles run..	50,489	51,625

The loss by exchange of subsidiary coinage for the week was equal to 20.57% of the gross cash collected on the cars, as compared with 24.77% for the corresponding week last year.

For the week ended January 22:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	15,232.78	13,024.25
Passengers carried ..	737,034	646,161
Car miles run..	49,445	50,754

The loss by exchange of subsidiary coinage for the week was equal to 20.67 per cent. of the gross cash collected on the cars as compared with 24.90 per cent. for the corresponding week last year.

Yokohama Electric Railway Co.—The Yokohama Electric Railway Company, at a general meeting of its shareholders recently held, decided on declaring a dividend of 8 per cent. per annum for the half year just ended, and this was followed by an extraordinary meeting at which a bill was passed for increasing its capital from 3,000,000 *yen* to 6,000,000 *yen*.

Shanghai Chinese Trams.—The Chinese Electric Tram Car Company was formed about eight months ago. There are five bridges to be built from the Shih-lu-pu to the Railway station of the Shanghai-Hangchow Railway and two bridges have been completed and there are three more bridges to be built, but these three bridges can be built when the rails are laid. Materials bought abroad are arriving at Shanghai, such as 156 rails, 93 rails for the sheds, and over 370 cases containing materials for electric batteries all of which are now in Shanghai. Rails inside the sheds for electric cars in front of the station of Shanghai-Hangchow Railway it was expected will be laid before the China New Year (Feb. 6th.) The electric poles, etc. will soon arrive at Shanghai.

Osaka Electric Railway Co.—Some time ago the company attempted to negotiate a loan from Samuel, Samuel & Co. through Masuda, a bill broker, but it failed on account of disagreement on terms, and the company next consulted Sale, Frazar & Co., but again it was not successful. As a final step the company has planned to import foreign capital in the name of the Electricity Trust Company with whom it operates. The president of the latter, Mr. Iwashita has approved the plan and at present he is negotiating with Samuel, Samuel & Co. through Masuda. The amount of the loan is put at one million yen with interest 7.5 per cent. or 8 per cent. including fees.

PERSONAL

Captain Pruneau of the French staff at Tientsin has been promoted to the rank of Chef de Battalion.

Mr. Crane has been appointed to succeed the late Mr. Edwards as representative of the Eastern Extension Telegraph Company at Peking.

Governor-General Forbes of the Philippines returned from furlough in January.

The death is announced at Hankow of Mr. W. Ostapenko, secretary to the Russian Municipal Council for about seven years.

Mr. G. H. Phipps, H. M. Acting-Consul at Kobe, was married to Miss Aline Purvis, youngest daughter of Professor F. P. Purvis, of the Engineering College of Tokyo, Imperial University, at St. Andrew's Church, Tokyo, on December 28, 1913.

Mr. F. M. T. Lange, Chief Electrical Engineer of Messrs. Samuel & Co., Shanghai, took over charge of the local office of the firm on December 25 as Manager during Mr. Keable's prospective absence.

Dr. E. Ohrt, German Consul at Nagasaki, returned to his post on December 23 via Siberia, after completing his furlough and visit home. Mr. R. Buttmann, who had been in charge of the Consulate during his absence, has been transferred to Shimonoseki as successor to Consul Müller.

Baron von Frankenstein, Councillor of the Austro-Hungarian Embassy, has been appointed Director of Commerce in London, and will leave for his new post early this year. He is most likely to be succeeded by Dr. Szent-Ivany von Lipto Szent-Ivan, who has been Secretary of the Legation at Bukharest.

It is reported that Lord Kilmarnock has been appointed to Tokyo as Second Secretary of the British Embassy.

Mr. Bela de Szentirmay-Darvasto, Austro-Hungarian Consul at Yokohama, has been promoted Consul-General and will remain in charge of the Consulate.

Mr. J. H. Laughlin, who was some years ago a very popular member of the American Embassy in Tokyo, has now been appointed as Secretary of the United States Embassy in London.

Prince Suleiman, former Sultan of Zanzibar who is on a voyage round the world, is expected in Japan shortly.

Mr. D. Crackanthorpe, First Secretary of the British Embassy at Tokyo who recently left for home on furlough, will not return.

Mr. E. M. Hobart-Hampdon, Japanese Secretary of the British Embassy, will soon leave for England on a year's furlough. It is said that Mr. Harold G. Parlett, British Consul at Dairen, will take the place of Mr. Hobart-Hampdon.

Mr. Butler, who has been acting as British Vice-Consul at Kobe, has been transferred to the Consulate at Tamsui.

Herr von Syburg, German Consul-General at Yokohama left for Berlin on January 4th by the Siberian route, to take up his new post as Minister to Abyssinia.

Mr. and Mrs. S. F. Mayers left Peking for Europe by the Siberian express on January 14. Mr. Mayers has been called home by the British and Chinese Corporation, whose representative he is in Peking, to give information to the Sextuple Group in London. Mr. G. A. Robertson will be in charge during the absence of Mr. Mayers.

Mr. Yoshida, Japanese Minister to Siam, was to leave for his post on January 30.

Sir Conyngham Greene, the new British Ambassador to Japan, and Lady Greene, were to sail for Japan on January 9.

News has been received in Tokyo that Dr. Baeltz, for a long time professor of the Medical College of the Tokyo Imperial University and a physician to the present Emperor in His Majesty's boyhood days, is now seriously ill in Germany.

Mr. Henri Stroehlin, First Secretary of the Swiss Legation in Tokyo, has been transferred to Paris in the same capacity. Mr. and Mrs. Stroehlin are now in Switzerland on leave. Mr. Stroehlin will be succeeded by Mr. de Stouz, First Secretary of the Legation in London.

Mr. Lars Anderson, the new American Minister to Japan, arrived in Tokyo on December 28, and was welcomed by a number of high officials. This is Mr. Anderson's fourth visit to Japan. Mr. and Mrs. Anderson, on their arrival in Seoul, on December 21, were met at the South Gate Station, by Mr. Yamagata, Administrative Superintendent, and the Departmental Directors of the Korean Government General, Mr. Scidmore, American Consul-General, and many other prominent men.

The death occurred at Tientsin on January 4 of Mr. Gustav Detring, formerly Commissioner of Customs at Tientsin, at the age of seventy.

M. Dejean de la Batie, Consul-General for France, left Shanghai for home on January 10. He is succeeded by Consul-General Kahn from Tientsin, who in turn has been succeeded there by M. Saussine from Chefoo.

Mr. Cyril J. Atkinson, M. I. Mech. E., inventor and patentee of the Atkinson Gas Producer and a number of special devices pertaining to Gas Producers, has severed his connection with the Dornfeld-Kunert Company of Watertown, Wisconsin and his services and the use of all his patents have been secured by Fairbanks, Morse & Co., and a number of Mr. Atkinson's valuable patents will be incorporated in the Fairbanks-Morse Gas Producers at once. This Company will place Mr. Atkinson's services at the disposal of the public for adapting the Fairbanks-Morse Gas Producers to meet the requirements of the various industries desiring to substitute producer gas for fuel oil. This will be of particular service and effect large economies in Forge shops, Malleable iron foundries, Galvanizing plants, Enamelling works, Brass undries, etc.

Mr. Thomas Sammons, American Consul-General at Yokohama, and Mrs. Sammons, returned to Yokohama on December 18 by the Pacific Mail Steamship *Mongolia*. Mr. Sammons departed on leave in May, and reports having had a very busy holiday. He crossed the American continent four times while absent, the greater part of the time being devoted to meetings with the chief commercial bodies and the leading manufacturers and exporters of the country. The Consul-General was also commissioned by the Foreign Office of his country to be present at the International Congress of Chambers of Commerce at Boston during the latter part of September.

Dr. Oya, Director of the Korean Railways, gave a dinner party at Seoul, on December 21, in honour of M. Radigin, a high official of the Chinese Eastern Railway.

Mr. Alexander Clark on December 12, 1912, celebrated the fiftieth anniversary of his arrival in Japan, at Yokohama.

Dr. Roest, the Currency Adviser to the Chinese Government, died suddenly at Mukden on January 11, while en route from Europe to Peking, under tragic circumstances.

Dr. Nathaniel Burwash, Chancellor of Victoria University, was to reach Yokohama on January 26th by the *Siberia*.

Mr. C. F. Benrath, manager of the shipping department of Messrs. Illies and Co., will return to Yokohama early in February.

The Danish Minister in Tokyo, Count Ahlefeldt Laurvig, who is also accredited to China, left for Peking on January 10th.

Mr. C. A. Beal, of the American General Electric Company, reached Yokohama on board the P.M.S.S. *Korea*.

Mr. R. André, of the French Embassy at Tokyo has been appointed Acting-Consul in Seoul during the absence of Mr. A. Guerin.

Herr J. F. B. van Blokland, Netherlands Minister in Peking, will start on leave in February.

News has been received of the death of Mr. J. B. Jackson, who was, until comparatively recently, Commissioner of Trade for Canada at Shanghai.

Mr. H. E. Fulford, C.M.G., has returned from home and has taken over H.B.M. Consulate-General at Tientsin from Mr. Barr, the Vice-Consul who has been acting since Mr. Wilton's transfer to the Legation at Peking.

Mr. Clarence Edward Gauss has been appointed Vice-Consul-General at the U. S. Consulate, Shanghai, in succession to Mr. W. R. Dorsey, who left recently to take up an appointment as Consul in Spain. Mr. Gauss is well-known to Shanghai, having been Deputy-Consul at the local Consulate from 1907 to 1909. Since the latter he has been attached to the Department of State in Washington.

Maj.-Gen. K. Shiba, Chief of Staff of the Kwantung Government, has been transferred to the Directorship of the Bureau for Military Affairs of the War Department, Tokyo, in succession to Maj.-Gen. Tanaka, transferred.

Senior Secretary Ohuchi, of the Kwantung Government, has been decorated with the third Class Order of the Sacred Treasure.

Mr. Wilton, who has been acting British Consul-General at Tientsin for some time past has gone to Peking to take over his new position in succession to Sir Alexander Hosie.

COMPANIES

Osaka Gas Company.—The above company has a capital of six million yen at present and with the extension of business it is in need of increasing the capital during the latter half of this year. The directors of the American side has already given their consent, but in connection with the tramway line question the company has become the centre of attack, and the plan for increasing its capital has been given up temporarily. The pressing need of capital however is not mitigated and the company instead of increasing capital has decided to raise debentures to the amount of about three million yen. The new debentures will be subscribed by the shareholders, and will not be opened to public subscription.

Japanese Companies.—According to the Japanese Ministry of Agriculture and Commerce the number of newly organised companies during last month was 400, with capital paid up amounting to 9,086,745 yen. The number of companies which were organised during the year 1912 reached 3,888 with capital paid up amounting to 110,919,882 yen which shows an increase of 770 in number and 16.619,507 yen in capital when compared with those of the previous year.

These companies may be classified as follows:—

Nature of undertaking	Number	Capital paid up Yen
Agriculture	76	3,911,845
Fisheries	26	895,698
Forestries	6	882,825
Brewing	130	1,587,245
Food and drinks	131	3,832,741
Fibre Industries	270	8,620,064
Chemical Industries	108	2,668,650
Ceramic Industries	41	595,125
Metal work	54	957,450
Cartwright and Shipbuilding	14	1,275,400
Manufacture of machines and implements	122	2,524,810
Gas and Electricity	123	6,950,000
Miscellaneous industries	392	7,517,092
Mining industries	27	6,064,000
Commission business	991	11,295,734
Warehousing	65	553,815
Banking	28	11,223,500
Trust business	219	3,814,345
Insurance	5	1,750,000
Miscellaneous	845	27,744,548
Conveyance and communication	216	6,255,995
Total	3,888	110,919,882

It is to be understood that joint stock companies, partnership companies, and limited partnership companies are included in these new companies.

Fuji Spinning Company.—The thirty-fourth semi-annual general meeting of the Fuji Cotton Spinning Company was held on December 21, presided over by the Managing Director Mr. Wada. The chairman submitted the business report for the term just ended. The following plan of accounts and distribution was unanimously adopted:

	Yen
Net profit for the term	1,245,913
Balance brought over from the previous term	216,573
Total	1,462,486
To be distributed as follows:	
Legal reserve	62,295
Reserve against loss	62,295
Bonus to operatives and pension funds, etc.	124,580
Bonus to directors	62,295
Dividend to shareholders (12% per annum)	600,000
Balance carried forward	551,011

Hongkong Land Investment Company.—The report of the Directors of the Hongkong Land Investment and Agency Company, Limited which was to be submitted to the shareholders at the twenty-fourth ordinary meeting on January 27, was as follows:—The net profits for the year 1912, including $41,758.85 brought forward from last account, after paying all charges amount to $400,421.19. From this amount an interim divided of $3.50 per share has already been paid. It is now proposed to pay a final dividend of $3.50 per share, and after writing off directors' and auditors' fees there remains a balance of $16,814.83 to be carried forward to the credit of a new profit and loss account.

West Point Building Company.—The following report upon the working of this company during the year ended on December 31st, 1912, was to be presented to the twenty-fourth ordinary meeting of shareholders on

January 27:—The net profits for the year, including the amount brought forward from the previous year, amount to $56,245.43. From this amount an interim dividend of $2.00 per share has already been paid, and after writing off directors' and auditors' fees, it is now proposed to pay a final dividend of $2.25 per share, making a total dividend for the twelve months of $4.25 per share, and to carry forward the balance $2,570.43 to credit of a new profit and loss account.

SHIPPING COMPANIES

Liaotung Steamship Company.—A steamship company has been incorporated at Dairen on a joint stock basis under the title of The Liaotung Steamship Company, Limited, reports the *Manchuria Daily News.* The Company is capitalized at yen 250,000, in 5,000 shares of yen 50 each. Yen 50 per share is to be called up as the first instalment. The scheme of organizing this Company was originally conceived by the Mitsui Bussan Kaisha, Dairen, and the shareholders are chiefly composed of those connected with, or interested in, that well-known firm. The first steamer for the service of the new Company will be the s.s. Edith, which has recently been purchased at Bombay. The Edith was the property of Messrs. Lambert Bros., Ltd., London, and was built in 1901 with a gross tonnage of 2,873. Her delivery to the new owners was to be effected in January. In addition, it has been decided to purchase a few steamers of 6,000 tons class from abroad for a similar purpose. The Company will be opened to business about next May. Mr. Y. Yakusawa, local Manager of the Mitsui Bussan Kaisha, Dairen, is to assume the management of the Company.

LIGHT AND POWER COMPANIES

Yokohama Electric Company. — The Yokohama Electric Company held a general meeting of its shareholders on December 21 when the following accounts were passed:—

Net profit for the current term	376,630.915
Amount brought forward	14,254.742
Total	390,885.657
Legal reserves	20,000.000
Reserves for redemption	40,000.000
Reserves for dividends	35,000.000
Bonus	30,130.000
Dividends (11 per cent. per annum)	246,140.000
Amount carried forward	19,419.657

Kinugawa Hydro Electricity Co.—In its extraordinary general meeting which was to be held January 29 on the company intended to propose an issue of debentures amounting to six million yen. At first the capital of the company was put at yen 13,500,000 which was afterwards increased to yen 15,000,000. Again the capital has recently been increased to yen 16,000,000 in order to meet the expenditure for the construction of the water reservoir at Lake Shimidzu. The capital has been called to the amount of yen 10,120,000. The new place of construction, however, needs a great amount of money and the company has a deficit of about six million yen which it decided to make up by issuing debentures. Leading shareholders, however, are of the opinion that the company will have to redeem one million yen which is due to Samuel and Samuel Co., and four million yen due to the Takata and Okura companies in the form of machinery, so that only one million is available. The company intends to issue debentures with the interest over 7 per cent. and the whole property of the company will be offered as security. It is, however, doubtful in view of the depression of the market whether the company will succeed in the plan.

Tamagawa Electric Railway Co.—This company has adopted a dividend of nine per cent. for preferential shares but no dividend will be made on ordinary shares. The company getting the supply of electricity by the Fuji Spinning Company next year will extend the electric light business and the dividend on ordinary shares will probably be declared on the latter term of next year.

IRON AND STEEL

Projected Iron Foundry at Kyomipo.—In a recent issue the *Seoul Press* gave a brief report concerning the projected establishment by the Mitsui Co. of Tokyo of an iron foundry at Kyomipo, a port on the Taitong River, Korea. Investigation of mines in the peninsula has steadily been pursued since 1906, and it was at last decided to establish an iron foundry at Kyomipo. The erection of the plant will be commenced next September, when an expert of the company who is now in Europe inspecting iron foundries will come back. Pending the interval, mining of iron at Kyomipo and Whangju will be steadily continued, and it is expected that mines at Chailyon and neighbourhood will also be worked. Some time will elapse before the foundry will be worked to the full extent of its capacity, owing to the great amount of preparation needed, but it is hoped that it may be made profitable in two or three years. More than 100,000 tsubo of land has already been bought at Kyomipo, as a site for the projected foundry.

Hanyang Ironworks.—Some of the foreign employees at the Hanyang Ironworks and the Pinghsiang collieries have been re-engaged. The former were to arrive in January, the latter are expected in March. Full work will again be begun.

MINING

Chinese Colliery Near Yingchengtzu.—The colliery at Huashihling near Yingchengtzu Station on the Kirin-Changchun Railway will be operated on an extensive scale from next spring. The Chinese interest-holders in the colliery are inviting subscriptions to the shares of the company. The output of this colliery is said to be of fine quality.

Penchihu Colliery & Mining Co.—Machinery ordered from abroad is arriving at Penchihu for installation at the steel works in project by the Penchihu Colliery & Mining Co.

The Gumaus Co.—The Gumaus Placer Company declared a ten per cent. dividend on Dec. 20 after a six weeks run, with all indebtedness liquidated from the product saved. This meant a distribution of P.50,000 among the Manila shareholders. It is thought in some quarters that the Gumaus Company will be able to declare a ten per cent. dividend every month in future.

SHIP-BUILDING

Japanese-Built Gunboats for China.—The Yung-Hsiang, a Chinese gunboat of 830 tons, built at the Kawasaki Dockyard, Kobe, was delivered to a Chinese officer sent to watch the construction of the ship on Tuesday, January 7. At noon the following day the leading Chinese residents in Kobe were invited to inspect the gunboat. She left Kobe on January 9 for Shanghai under the command of Captain Nishio, of the Kawasaki yard, according to the agreement. The sister ship Yung-Feng, built at the Mitsu Bishi Yard, Nagasaki, left Nagasaki on January 10 direct for Shanghai.

PUBLIC WORKS

Philippines Appropriation.—A bill appropriating one million pesos for the construction and maintenance of public highways, drilling artesian wells at different points throughout the islands, and replacing certain lighthouse towers by steel structures, was introduced in the Philippines Assembly on January 11 by the committee on public work. This bill contained a provision that P.500,000 of the total amount should be set aside for the new capitol building, which provision was rejected by an amendment, thus making the whole amount available for the purposes mentioned above.

GENERAL

It is stated from New York that one of the largest cargoes of locomotives ever shipped from America has recently been taken out to Japan by the British steamship *Shimosa.* The locomotives, 30 in number, are of the largest type, built by the Baldwin Locomotive Works, and are intended for the Imperial Railways of Japan.

The contract for the new telephone system at Tientsin has been secured by Messrs. Arnhold, Karberg and Company for the Western Electric Company. It is understood that the price is $50,000 Mex.

The opening of the works of Messrs. Lever Brothers (Japan) Limited took place at Tori-Shinden, Osaka, on January 24th.

The Manchurian Flour Mill Company, of Tiehling, Manchuria, has decided to call up 5 yen ($2.50) per share for constructing and equipping a branch mill at Changchun. The foundations have already been completed. This company distributed its net profit for the past trade year as follows: Legal reserve, $1,000 (United States currency); special reserve, $1,500; consolidation fund and depreciation reserve, $5,000; bonus to officers, $1,500; dividend to shareholders (at the rate of 10 per cent. per annum) $6,000; carried forward to the next term, $1,700.

HONGKONG AND SHANGHAI BANK

Subject to audit, the Directors of the Hongkong and Shanghai Banking Corporation, recommended a distribution of the profits for the half year ending 31st December 1912 as follows:—

Payment of a dividend of	40/- per share
Payment of a bonus to shareholders	5/- „ „
To be added to Silver Reserve	$200,000
To be written off Premises a/c	$200,000
To be carried forward	$2,000,000

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Manila Railroad Co.
South Manchuria
Southern Pacific Co.
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Engineering

Finance Commerce

遠東時報

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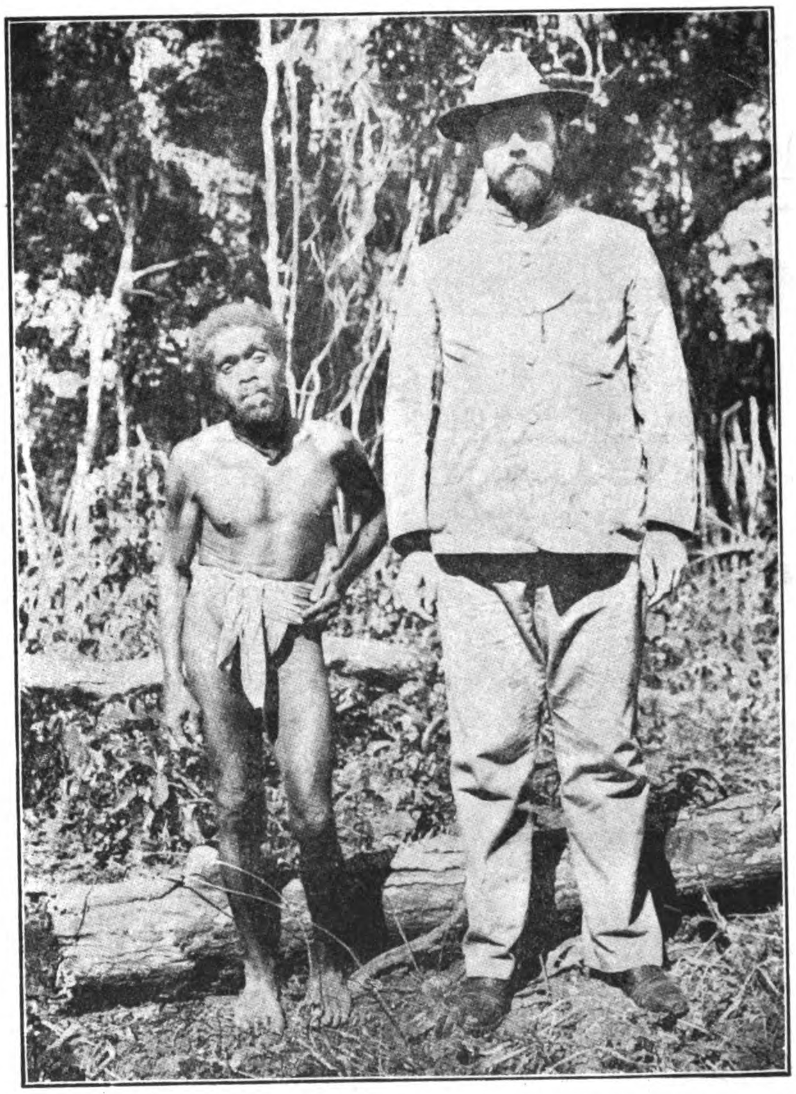

A TYPICAL NEGRITO MAN WITH SECRETARY WORCESTER

This photograph shows the relative size of the Negritos compared with a six foot American

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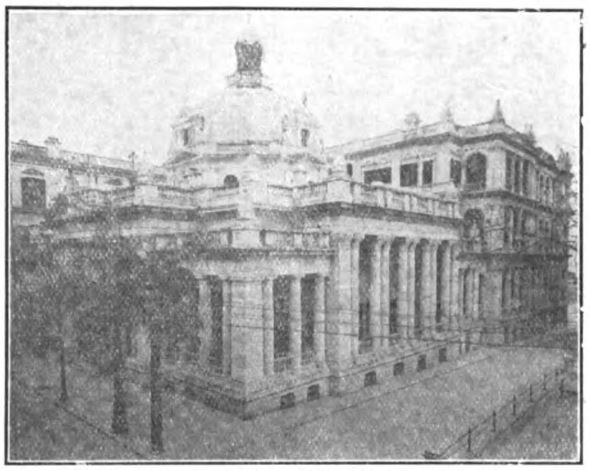

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, FEBRUARY, 1913 No. 9

LESSONS IN CIVILIZATION

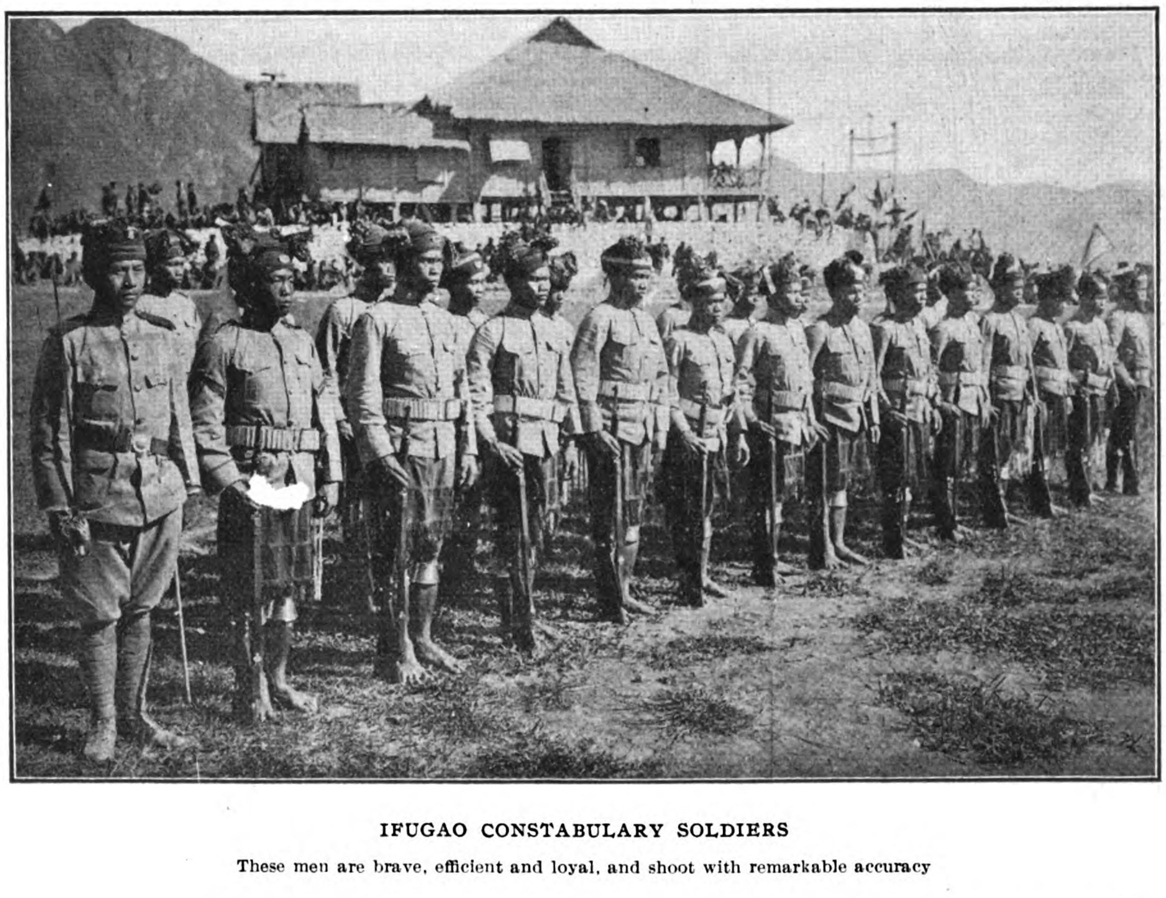
THE "WILD PEOPLE" OF THE PHILIPPINES

"A barrier reef, sloping abruptly from deep water to the very surface of the sea, borders this coast for scores of miles. Even in periods of apparent complete calm the long Pacific swell breaks on the edge of this reef in such a manner as to make landing quite impossible.

Although it had been claimed that there were no ports for anything bigger than native dugouts, we found several fairly good small harbors, none of which were shown on the chart. Indeed, long stretches of the coast-line proved to be 10 to 15 miles out of place. We were able to land in these harbors, as well as at several other points where small freshwater streams had prevented the growth of coral, so that there were passages through the reef to the sea. The approach of our steamer caused consternation among the Negritos, and we could plainly see them abandoning their "houses" in all haste and running for the jungle, where they remained in hiding in spite of all our efforts to get into communication with them."

"Governor Miller was drowned in the discharge of his duty. Mr. Bondurant, assistant to the governor, died of pernicious fever on the evening of his last day's work in the field. Mr. W. B. Dawson, the first superintendent of the Aborlan School, died of malaria at his post, and Mr. Wooden, the second superintendent, was drowned while hastening back from the provincial capital."

These are not extracts from a book such as "Treasure Island" they are, on the contrary, matter-of-fact statements from official and unofficial reports by Dean C. Worcester, the Secretary of the Interior, Philippine Islands. Mr. Worcester's reports read like romances, and they lose nothing of the romantic because they are based on the actual doings of a handful of Americans, who are devoting the best years of their lives to the moral and material upraising of the Filipino people. In previous issues of the REVIEW, we have referred to the magnificent work for civilization which is being accomplished in the wilder portions of the Philippine Islands. But each successive report impresses us the more vividly with the superb self-sacrifice and splendid courage of these men who are doing things of which little is heard, and for which there is practically no reward except the consciousness of having faced a difficult and delicate problem fearlessly and with success.



IFUGAO CONSTABULARY SOLDIERS

These men are brave, efficient and loyal, and shoot with remarkable accuracy

In his report to the Government under date; Manila, September 18th, 1912, Mr. Worcester gives a brief retrospect of the work done among non-Christian tribes. He concludes the report by saying: "It is impossible by words alone to bring home to the public the extraordinary character of the progress which is being made by the people of this little known tribe (the Bukidnon people). In preparing this report I have attempted to illustrate this progress by the liberal use of photographs, in the hope of thus bringing the facts home more effectively than would otherwise be possible." This statement is absolutely correct, as words must necessarily fail to give an adequate idea of the conditions of life and the peculiarities of the people, amongst whom the work of reformation is proceeding. We have, therefore, largely followed in this Mr. Worcester's example and have reproduced some of the excellent photographs which illustrated his annual report and the striking article entitled "Head-Hunters of Northern Luzon," which he contributed to the *National Geographic Magazine*.

Attention is drawn in the report, to the fact that the Philippine Commission, in August, 1911, passed an Anti-Slavery Act, which rendered immediately possible the release of a considerable number of Ifugaos held in slavery or involuntary servitude by Filipinos in Nueva Vizcaya. In that locality, the road and trail system has been extended and improved, and increased control has been established over the scattered Ilongots who inhabit the great forest area recently added to the province.

In the Mountain Province, the wild inhabitants number some 400,000. Here, also, road-making has been pushed on and this applies to Ifugao, Bontoc, Kalinga, Apayao, Lepanto, Amburayan, Benguet, Mindoro, Palawan, Agusan and Bukidnon.

One touching little incident is related in connection with Captain Jeff D. Gallman, Lieutenant-Governor of Ifugao. At the time of Mr. Worcester's annual visit to Kiangan, Lieutenant-Governor Gallman was lying in the Bontoc Hospital recovering from a severe surgical operation. His absence from the festivities was deplored by the Ifugaos, who insisted on singing and dancing in the room in which the telephone was located in order that he might hear the resulting uproar while lying in his bed 70 miles away, and one of the chiefs, standing before the telephone, made a speech for his benefit. The people then insisted on hearing his voice, in order that they might be sure that he was alive.

Mr. Worcester points out, in reference to his annual northern inspection tour, that the need of entertaining the great crowds of wild men who meet the Secretary of the Interior on these trips is imperative, and at times embarrassing. The gatherings often include large numbers of men who have until recently been bitter enemies, and who are liable to indulge in untimely reminiscences, with unfortunate results, if not kept actively occupied. This problem was solved in part in a somewhat novel way by taking a portable moving-picture outfit and showing their wild friends something of life in a world heretofore beyond their ken. At the same time the party took cinematograph films designed to afford an accurate and permanent record of characteristic scenes and events in the now rapidly changing life of these comparatively primitive tribes.

We take the following further interesting extracts from the report of the Secretary of the Interior:—

The Province of Mindoro.—Rapid progress has been made in Mindoro during the year. A small, but very useful, cement pier has been constructed at the capital. The road and trail system has been rapidly pushed. One can now ride from Calapan to Pinamalayan. The trail system will be extended around the entire island as rapidly as circumstances will permit.

The Filipino towns have become models of cleanliness and good sanitation. They afford a valuable demonstration of what can be done to better shocking insanitary conditions where effective control is possible. The contrast between sanitary conditions in the Mindoro towns and in the towns of the regularly organized provinces is very striking. One most gratifying practical result is that the Mindoro schoolhouses are all becoming much too small. The towns swarm with happy, healthy youngsters who are now growing up to useful citizenship instead of meeting the untimely death which awaited so many of the children when almost every yard harbored some reeking source of disease.

The work for the Mangyans has been actively pushed. Our knowledge of these semi-nomadic but gentle and harmless savages has been materially increased. Some of them have been persuaded to build villages and settle down to a more orderly life. Several new schools have been established for Mangyan children, who prove to be bright, capable pupils.

Many parts of Mindoro suffered very severely from the drought, and some care has been necessary in order to keep the people on the outlying small islands supplied with rice.

After more than five years of faithful and efficient service, the governor of the province, Captain Louis J. Van Schaick, U. S. Army, tendered his resignation, anticipating the necessity of returning to his regiment upon the passage of the Army and Navy appropriation bill then pending, and desiring to enjoy a well-earned leave before reporting for duty. The resignation from the special government service of an efficient officer who has profited by so many years of experience is a serious loss. The vacancy has been filled by the appointment of Mr. R. E. Walters who has long been employed by the Bureau of Lands in a capacity which has brought him into constant and close touch with the poorer Filipinos, whose right in the matter of land holdings he has had frequent occasion to defend. It is believed that this experience will especially fit him to protect the interests of the Mangyans, who are still in many instances mercilessly exploited by the Filipinos of the coast towns.

Ability to find profitable employment on the San José Estate and on the Mindoro Company's holdings has been a valuable asset for the working people of Mindoro during the trying drought. A few Mangyans, even, have sought employment there.

The Province of Palawan.—The provincial service of Palawan and the special province service in general met with a serious and deeply regretted loss in the death of the assistant to the provincial governor, Mr. Olney E. Bondurant, caused by pernicious malarial fever. He died at Balabac on January 20, 1912, soon after his return from the United States. Mr. Bondurant had immediate charge of

THE WONDERFUL RICE TERRACES OF IFUGAO—GENERAL VIEW OF VALLEY

southern Palawan, the territory under his jurisdiction including all of the Moro and most of the Tagbanua country. He had rendered very important service in connection with the moving of renegade Moros from the west coast and had made rapid progress in the establishment of helpful and friendly relations with both Moros and Tagbanuas. He was a fearless, tireless, efficient officer. Even when attacked by the illness which ended his life he refused to give up, but rendered service in the field on the day of his death. His death was keenly regretted by many of the unruly Moros whom he had brought under Government control and whose interests he carefully safeguarded as long as he lived.

The vacancy which it created was filled by the appointment of Mr. Lewis Carrigan, who had previously held the position of superintendent of schools in Agusan and had there actively taken part in work for the betterment of wild people.

The drought would have produced actual famine in the Moro country had it not been for Government assistance in the form of opportunity to work for rice, the affording of which was highly appreciated and has gone far to promote friendliness.

Most satisfactory progress in dealing with the Tagbanuas has been made possible by the transfer from the west coast of the Moros who formerly so persistently plundered them and the establishment of effective Government control over the entire Moro population of Palawan.

The opening of so-called Government exchanges where the Tagbanuas can sell their products and can purchase what they need at reasonable prices has greatly pleased them and is bringing about helpful contact between provincial officials and wild men from the most inaccessible regions.

In order to prevent trespass by Filipinos upon their cultivated land, a Government reservation has been set aside for them at Aborlan, where a Tagbanua Industrial School is located. Families are settling on this reservation in constantly increasing numbers. A large tract of land has been cleared and planted. The school is accomplishing important results, although its work was interrupted during the year by the death of its superintendent, Mr. William M. Wooden, who was drowned in the surf while trying to swim ashore from a launch.

While much has been accomplished in bettering the condition of the people of Palawan, the cost to date in valuable lives has been heavy. Governor Miller was drowned in the discharge of his duty. Mr. Bondurant, assistant to the governor, died of pernicious fever on the evening of his last day's work in the field.

THE WONDERFUL RICE TERRACES OF IFUGAO—NEAR VIEW SHOWING STRUCTURE OF TERRACE WALLS

The Moros of Palawan are now astonishingly friendly. I recently visited their towns without a guard. No member of my party carried a weapon of any sort. At the invitation of the Moro chiefs we sat at meat with them. The wives of the ranking chiefs appeared publicly during our visit. These latter two occurrences are unprecedented in my experience. Dato Tumay, whose men attacked my escort two years ago, showed me with great pride that he had built with his own hands the best house in Bonabona and was himself tilling the largest piece of land cultivated by a Moro in Palawan. Plows and other agricultural implements were requested by the Moros and have been furnished them.

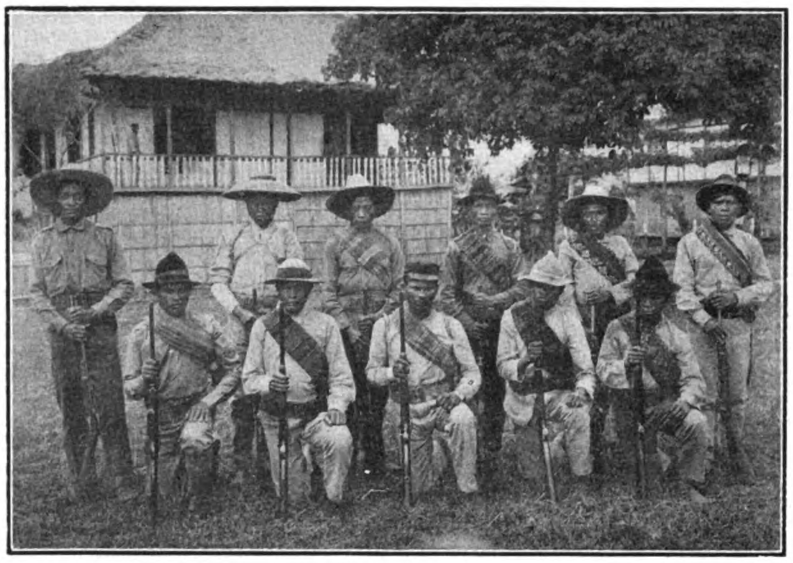
Trail work has been rapidly pushed. During much of the year it is now possible to ride a horse from Puerto Princesa Bay to Bonabona. An excellent line has been staked across the island from Separation Point to Alfonso XIII, and construction work has commenced.

The Tagbanuas, like the Moros, are beginning to display willingness to settle in villages. Although heretofore somewhat prone to use blowguns and poisoned arrows in the defense of their rights, and in standing off strangers as to whose intentions they entertained doubts, they are naturally industrious agriculturists, raising more than enough rice for their own needs. The opportunity now afforded them to sell their surplus products and to improve their agricultural methods should lead to rapid progress.

Mr. W. B. Dawson, the first superintendent of the Aborlan School, died of malaria at his post, and Mr. Wooden, the second superintendent, was drowned while hastening back from the provincial capital. The results for which these splendid men paid so dearly are worth the cost if they are to be *permanent*. Were they to be rendered futile by the premature withdrawal of American control, the price would indeed be dear.

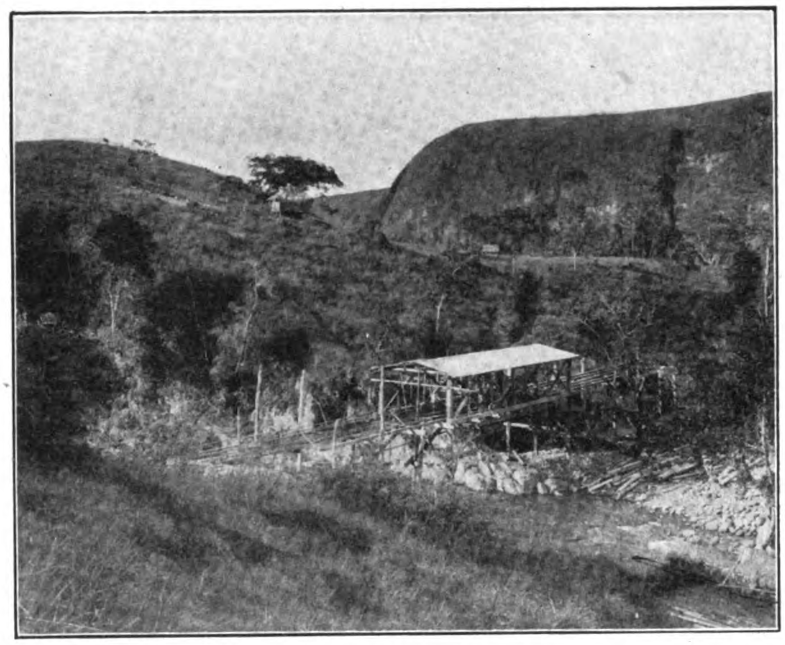
During the absence of Governor Evans, his duties were performed by the provincial treasurer, Mr. Clark, who was already carrying a heavy load at the time he assumed them. Governor Evans' return from leave made possible the more active prosecution of work in central and northern Palawan and in the adjacent islands.

FINISHED TRAIL BUILT BY IFUGAOS



BUKIDNON VOLUNTEERS

The Bukidnon people are aiding effectively in policing their own territory. These volunteers, armed with Springfield carbines of the old type, did very effective work in killing, capturing and dispersing the members of a band of outlaws which murdered fourteen people. Stripped of all superfluous clothing and carrying neither luggage nor rations, they moved very rapidly and seemed able to remain in the field indefinitely, living on the products of the forest.

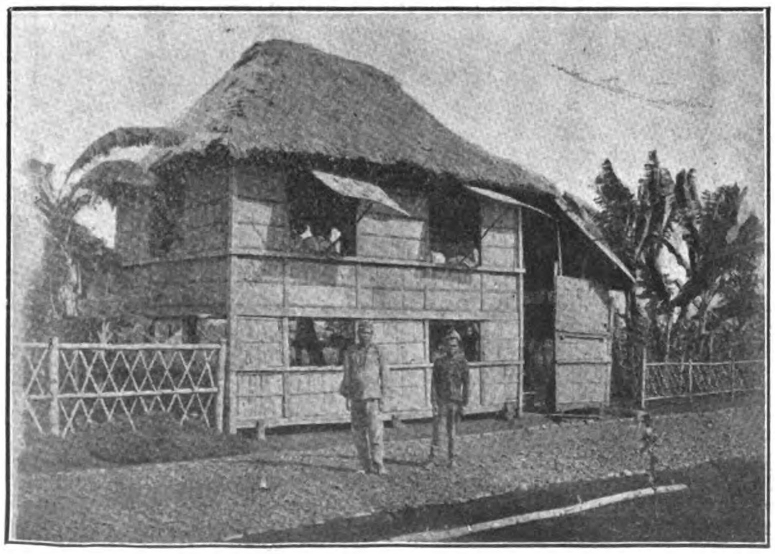


OPENING UP COMMUNICATION IN BUKIDNON

This bridge, 300 feet long, with a central span of 75 feet, is being built by the Bukidnon foreman Leoncio.

OPENING UP COMMUNICATION IN BUKIDNON

Bringing in a bridge timber. The heavy hardwood timbers used in bridge construction are often dragged for ten or fifteen miles by hundreds of men. The towns vie with each other in the construction of excellent bridges which cost the subprovince nothing except the price of the iron bolts required to fasten the timbers together.



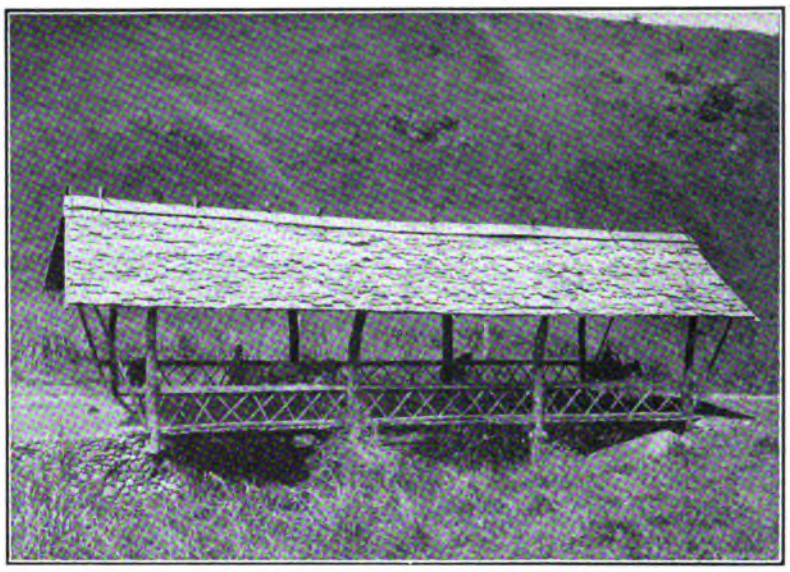
A BUKIDNON HOUSE OF THE NEW TYPE

FINISHED TRAIL BUILT BY IFUGAOS

Note the irrigation ditch. The grades on many of the trails are such that irrigation water can be carried in ditches beside them for long distances.

TYPICAL LOW-GRADE TRAIL LEADING INTO A CANON

The level plains of Bukidnon are cut at rather frequent intervals by canons, some of which have a depth of a thousand or more feet. The old trail into and out of them ran at impossible angles and made it very difficult for pack animals to carry even moderate loads. The difficult problem of building low-grade trails through them has been successfully solved.

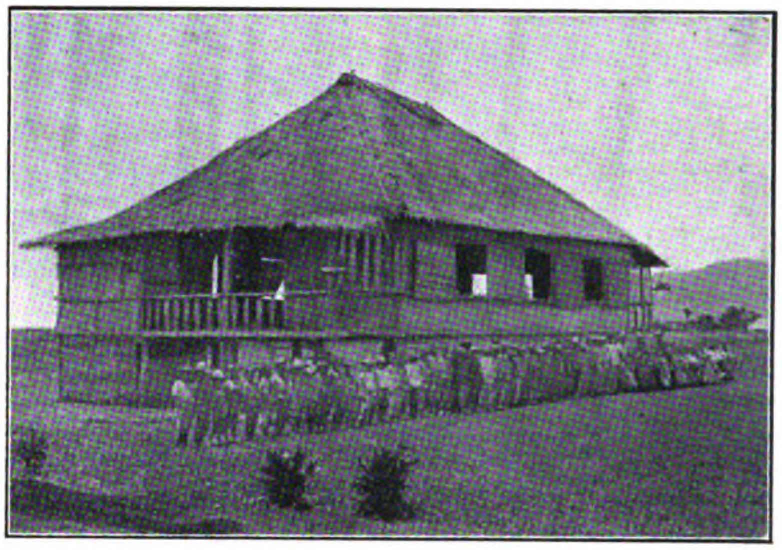


OPENING UP COMMUNICATION IN BUKIDNON

A typical bridge over a small stream. There are more than a hundred bridges between the coast and the subprovincial capital, rendering it unnecessary to ford a single stream. At the outset, there was not a bridge nor a culvert in the subprovince and travel was impossible during heavy rains. Now it is never interrupted by high water.

PRACTICAL INSTRUCTION

Bukidnon school boys learning to break sod with mattocks. Heretofore the Bukidnon people have thought it impossible to break the sod of the rich grass land.



A TYPICAL SCHOOL HOUSE IN BUKIDNON

The pupils in the foreground. The people of each Bukidnon village are only too glad to build a school-house and a dwelling-house for a teacher if assured that one will be assigned to them. The Bureau of Education is not only teaching the children English, Arithmetic, etc., but is giving practical instruction to boys in Agriculture and to the girls in Weaving, Sewing, and other household arts.

A TYPICAL STREET IN A NEW BUKIDNON TOWN

The towns which are being built up by the members of this non-Christian tribe are models of cleanliness and sanitation.

A TYPICAL STREET IN MALAYBALAY, THE CAPITAL OF BUKIDNON

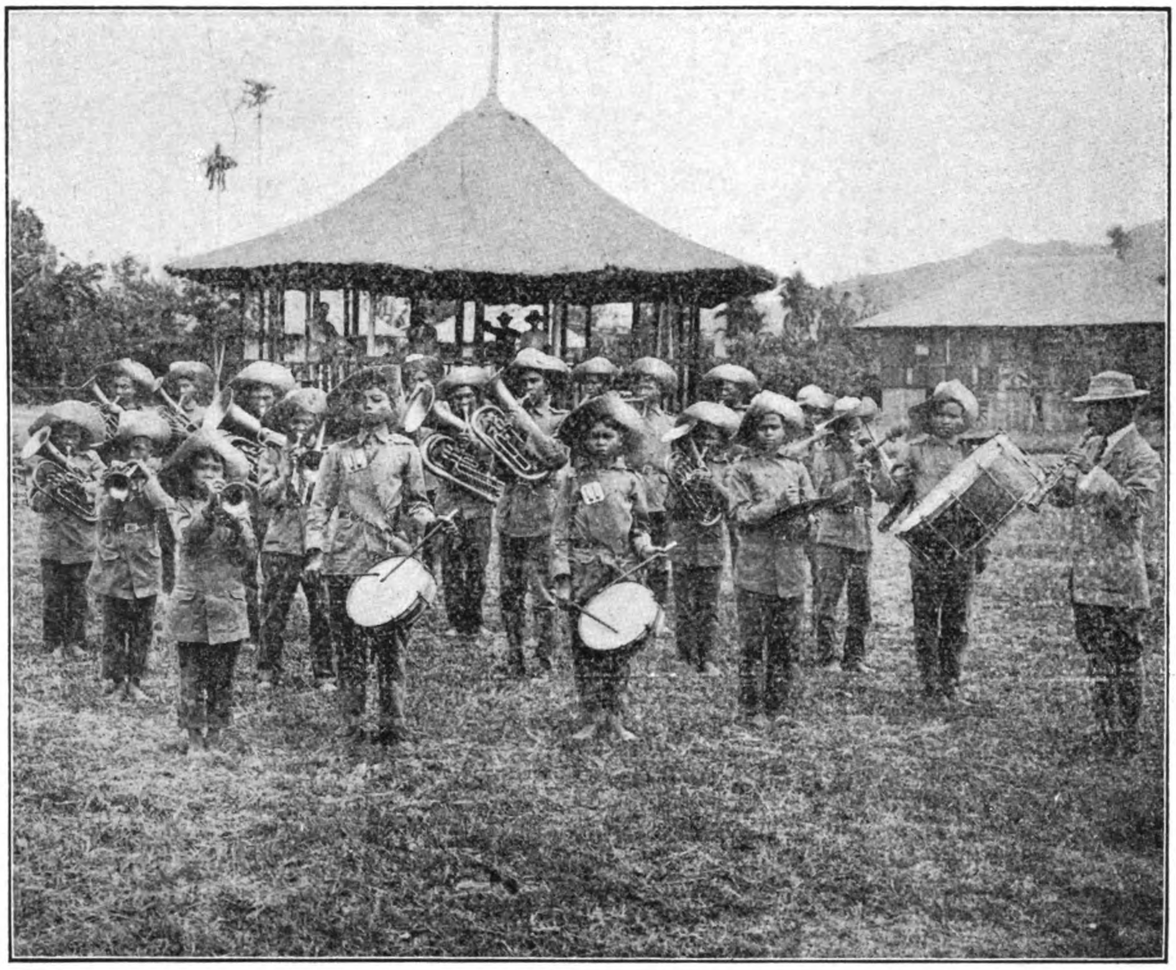
Note the stone sidewalks and the gravel surfacing on the streets.

Encouraged by the results of the sanitary campaign so successfully carried out in Mindoro, I have inaugurated a similar one in the Filipino towns of Palawan. Bad conditions at Puerto Princesa and at Cuyo have already been remedied to a large degree and the work will be carried into the smaller towns and barrios as rapidly as practicable.

Palawan suffered even more severely from the drought than did Mindoro. Coconut palms and even forest trees were killed. Dry weather apparently favored the reproduction of a common caterpillar which became a scourge, eating such crops as the drought spared. In a number of places actual famine was averted only by providing opportunity to labor on public works and obtain payment in rice.

THE PROVINCE OF AGUSAN.—The Province of Agusan has two subprovinces, Butuan and Bukidnon. Butuan is composed largely of low-lying forest land and swamps through which flow the Agusan River and its tributaries. Bukidnon is largely made up of high, grassy plains forested sparsely, if at all. It enjoys a temperate climate, and while wonderfully well watered is without navigable streams. Rainfall is heavy and quite uniformly distributed throughout the year in both subprovinces, neither of which suffered severely even during the recent unprecedented drought.

Four different men have held the post of governor during the year. Acting Governor John R. White was succeeded on September 28, 1911, by Frederick Lewis, promoted from the position of lieutenant-governor of Bukidnon.



THE MALAYBALAY BAND

This really good band is composed entirely of Bukidnon boys and is the pride of the people of this tribe, not a member of which knew how to play any band instrument at the time it was organized

The capital of Agusan is at Butuan and the principal work of the provincial governor is in the hot, damp subprovince of the same name. Governor Lewis's health, which had been weakened by long-continued and arduous service in Bukidnon and was not fully restored, soon began to fail. For this reason he tendered his resignation and I reluctantly recommended its acceptance. He was immediately transferred to an important position in the Mountain Province, where favorable climatic conditions speedily restored him to vigorous health.

The vacant governorship was temporarily filled by the appointment of Captain G. O. Fort, Philippine Constabulary. Captain Fort was the ranking Constabulary officer in the province and was engaged in an active and effective campaign against Tauidi and Hulibayan, the murderers of Mr. Ickis, and the band of outlaws and assassins which they have gathered around them. I greatly regretted the necessity for interfering with this work by imposing on Captain Fort additional duties, but there seemed to be no other competent man immediately available for the place. As soon as possible it was regularly filled by the promotion of Governor Bryant of Nueva Vizcaya.

OLD STYLE BUKIDNON HOUSE

This is a typical house of the kind which is now being rapidly abandoned as the people move into the towns. In many cases they have been living in structures even more primitive than this.

OPENING UP COMMUNICATION IN BUKIDNON

General view of a stretch of typical low-grade trail for pack animals and mounted travelers.

This trail was surveyed and built by Leoncio, a Bukidnon man.

OPENING UP COMMUNICATION IN BUKIDNON

Typical unsurfaced road in the outskirts of a town. The chief problem connected with road construction in Bukidnon is to obtain surfacing material, the prairie soil being almost entirely free from stone.

OPENING UP COMMUNICATION IN BUKIDNON

The construction of good roads and trails has rendered it possible to treble the load carried by pack animals.

IFUGAOS BUILDING TRAIL

This photograph shows work just begun on a steep mountain side.

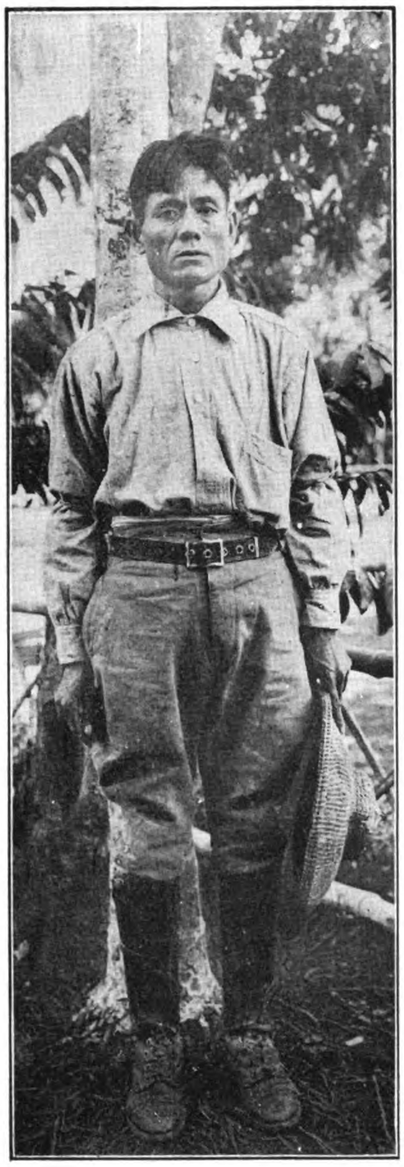
OPENING UP COMMUNICATION IN BUKIDNON

Typical low-grade trail for pack animal and mcunted tr..velers. Near view to show type of construction.

THE "PRESIDENCIA," OR MUNICIPAL BUILDING, OF A BUKIDNON TOWN

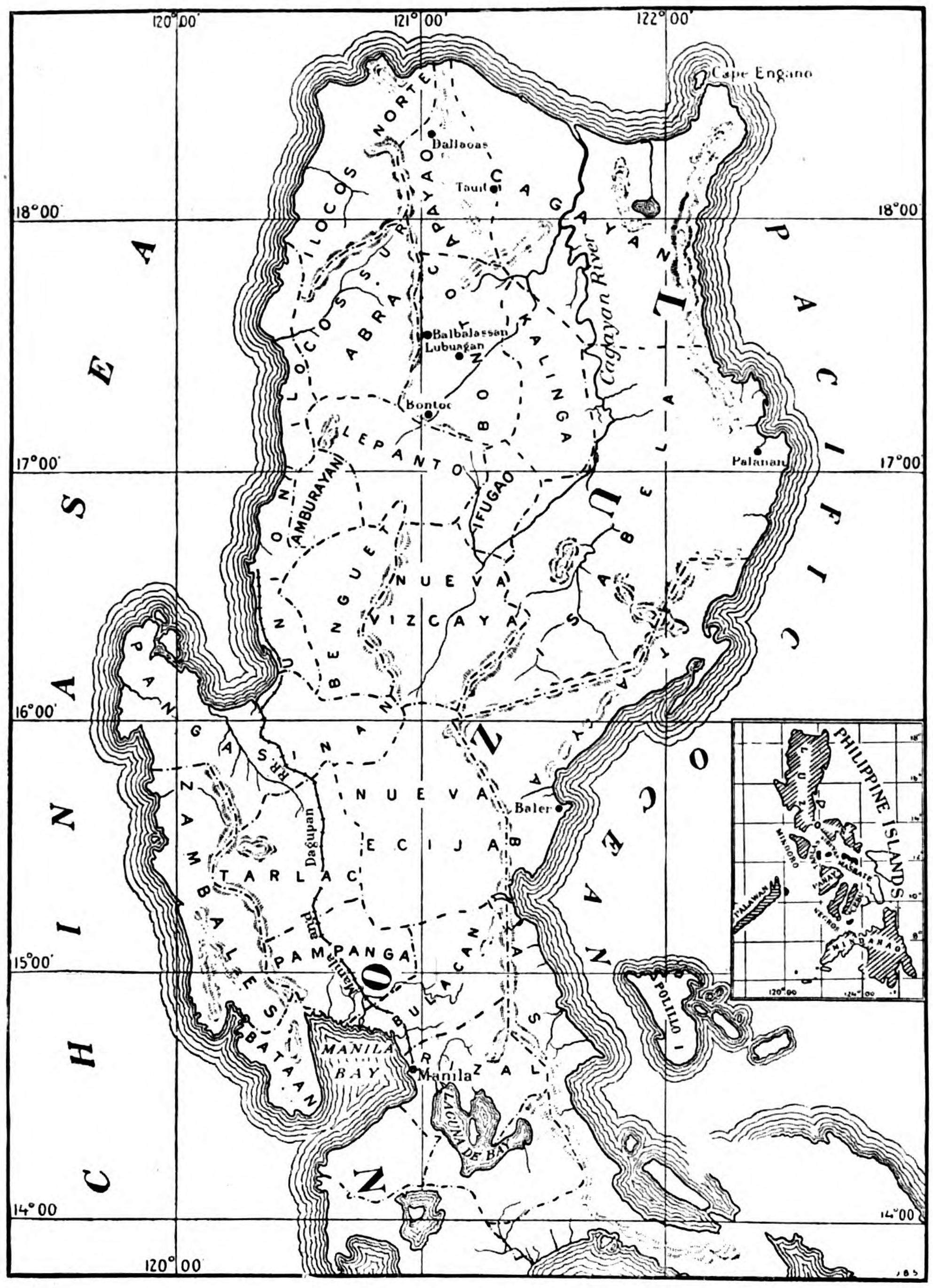
NEW ARRIVALS IN TOWN

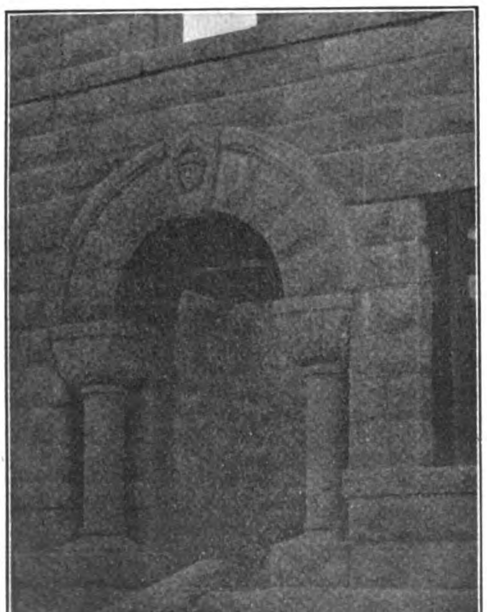
These people, who have just come in from the hills, where they have abandoned a tree house, have been decked in the garb of civilization by kindly Bukidnon neighbours who are already old residents. They have built themselves a hut for temporary occupancy while constructing a house of the improved type which is already under way. They have partially fenced in and planted ground which they will soon begin to cultivate. The evolution of families from barbarism to civilization may be seen in the outskirts of every Bukidnon town.



OPENING UP COMMUNICATION IN BUKIDNON

This is one of the men who helped to do it. At the outset, the people of this tribe did not know what a good trail was like. Most of them had never seen a bridge nor a culvert. Leoncio, the Bukidnon man here shown, who is completely illiterate, is to-day surveying and building low-grade roads and trails and planning and constructing long bridges over rushing mountain rivers. He has learned all he knows from Lieutenant-Governors Lewis and Fortich. His compensation, with which he is well satisfied, is P.2 per day.





EXTRANCE TO STONE SCHOOL-HOUSE BUILT BY IFUGAO BOYS

The Ifugao Head over the door was cut by the American Instructor. All the other work was done by the boys.

Gratifying progress has been made at Butuan, which is now a beautiful town, and in many of the Manobo settlements on the Agusan River and its tributaries. The long-haired wild men from the hills continue to come in, form villages, and settle down to a peaceful and orderly life.

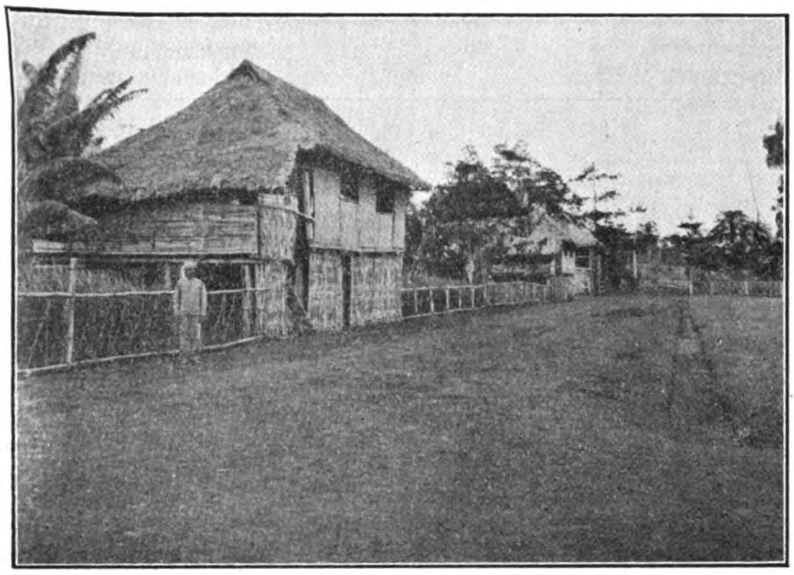
The mileage of navigable rivers is being steadily increased by the removal of obstructions. The upper Agusan was in 1905 cut off from the lower river by earthquakes which caused subsidence over an extensive area with resulting submersion of forests, creation of lakes and swamps, and complete obliteration of the old river banks. Two canals, navigable for good-sized launches, have now been opened through this region.

No trails other than mere footpaths have as yet been constructed in the subprovince of Butuan.

In the subprovince of Bukidnon the road and trail system has been extended and improved in a most gratifying manner. Nothing could be more satisfactory than the spirit of the Bukidnon towns, which vie with each other in the building of good roads, the construction of substantial bridges, and the erection of attractive public buildings. The population of the towns grows steadily as the wild men in the hills become convinced of the desirability of coming in and settling. The area under cultivation also steadily increases. The drought left this wonderful agricultural region practically untouched.

At the time we first obliged the people of Sumilao to clean up their yards we found a few old coffee trees badly affected by blight. We suggested that they plant coffee and thus get additional benefit from the work necessary in keeping the yards clean. The resulting good cultivation, unaided by any other means whatever, has so increased the vigor of the coffee bushes as to enable them to resist blight. Two-year old bushes are bearing heavily, while those planted a year earlier are actually breaking down under their burden of fruit. This one small town will ship 3,000 cavans of coffee during 1912.

One serious calamity has marred the otherwise uninterrupted progress of this subprovince. Tauidi's outlaws raided outlying territory, killing two influential, loyal chiefs and a score of men, women and children. Requests for Constabulary assistance remained long unanswered, as did an urgent demand for a limited number of firearms so that the people might protect themselves. I then appealed directly to the Governor-General, with the result that the needed firearms were promptly forwarded, and that a company of Philippine Scouts was hurried to the scene of disorder. This Scout Company rendered most satisfactory service in protecting the towns, restoring the confidence of the people, and dispersing the outlaws. Twenty-five Springfield carbines were effectively used by Bukidnon volunteers, who rendered very valuable service both independently and in co-operation with the Scouts. Absolute tranquillity has since prevailed. The outlaws were driven back into the Umayam District in Butuan, where an effective Constabulary force awaited them. As a result of the thorough

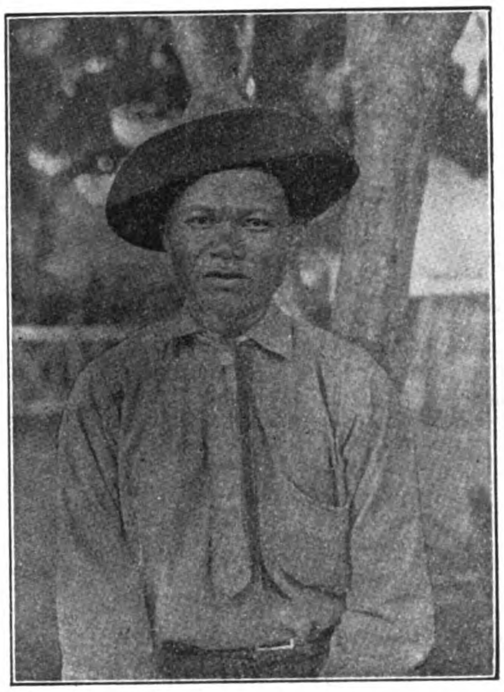


A SCENE IN MARAMAG

Maramag is one of the newest of the Bukidnon towns. A year ago the houses of many of its present inhabitants were located in tree tops in the neighbouring mountains. Now these same people are using a lawnmower to cut the grass on their town plaza, a bit of which may be seen at the right.

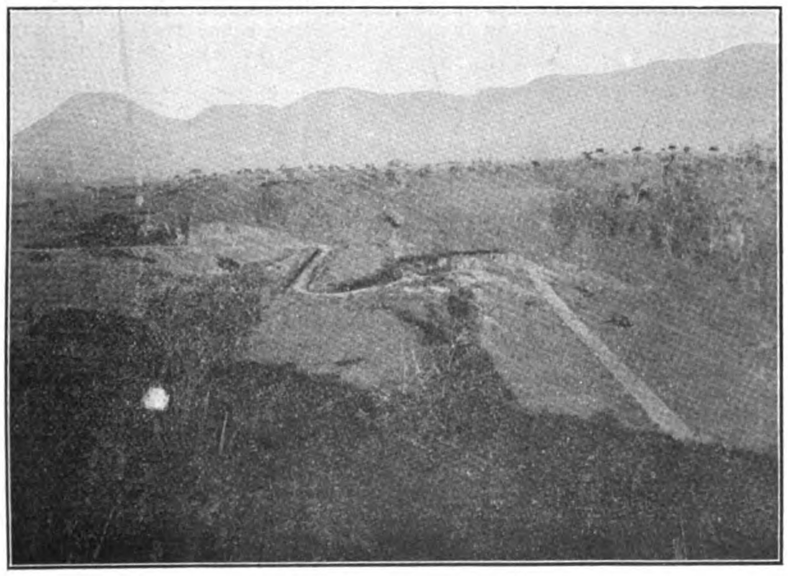
BUKIDNON MEN PLOWING WITH A GOVERNMENT OUTFIT

One of the powerful influences which has proved effective in persuading the Bukidnon people to settle in towns has been the furnishing of a number of disc plows, each drawn by four bullocks, with which the thick prairie sod can readily be broken. When this has once been done, the men can thereafter successfully cultivate the underlying soil with mattocks.



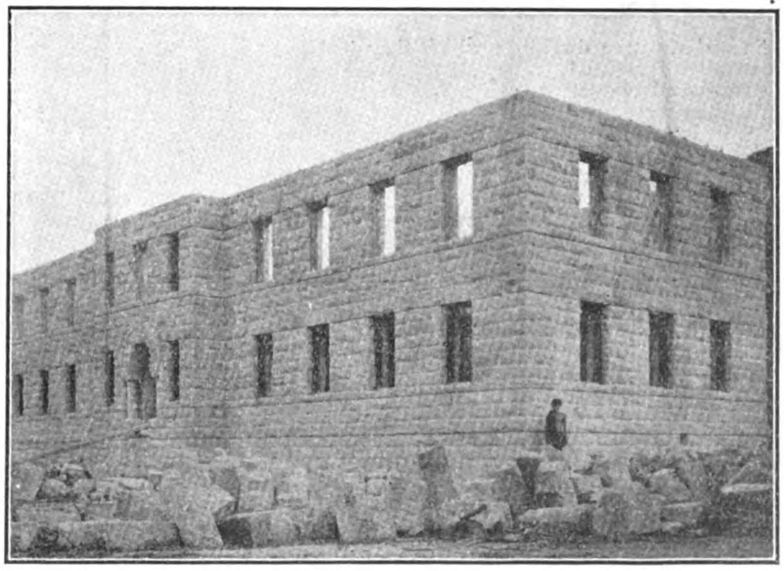
THE PRESIDENTE OF SILAE THE OLD AND THE NEW THE PRESIDENTE OF IMPASUNGONG

The presidente of Silae is an old fighting chief, as is shown by his wearing the head-dress which may be donned only by highly successful murderers. He has recently come in from the mountains with his people and is building up a good town. In many towns, however, it has been found better to use young men for officials. The presidente of Impasungong, who has built up one of the best towns in the subprovince, was taken out of school and appointed to municipal office!



OPENING UP COMMUNICATION IN BUKIDNON

The main road from the coast at the point where it descends into the Mangima River canon.



STONE SCHOOL-HOUSE BUILT BY IFUGAO BOYS

This remarkable structure is being erected at Quiangan by Ifugao school boys who are doing all the work under the direction of an American teacher. They have split boulders, shaped the stone thus obtained, faced it, and laid it and are now doing the wood work.

shake-up which they then received, some 400 of them have sought and received permission to settle in Bukidnon, while a considerable additional number have followed a similar course in Butuan.

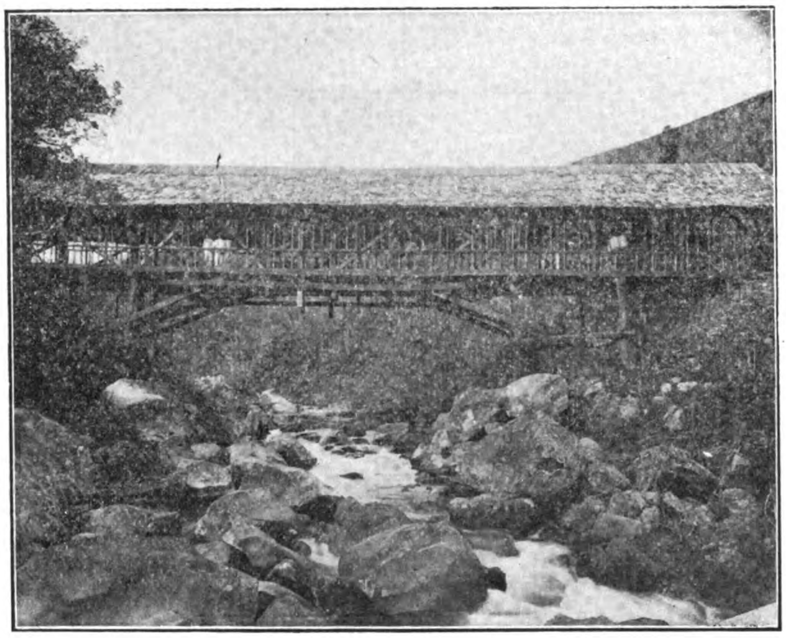
Lieutenant-Governor Fortich continues to have extraordinary success in influencing wild men to come in from the hills and establish model villages. At Maramag, one of the newest and most inaccesssible of these in the very heart of Mindanao, I found the Manobos cutting the grass on their town plaza with a lawnmower, and building excellent houses in lieu of the tree dwellings which they had so recently forsaken! The streets were well constructed and clean, and adequate sanitary facilities were present.

NEGRITO MEN WITH BOWS, ARROWS AND HEAD-AXES READY FOR THE TRAIL

The loyalty of these people, when they realize that instead of being oppressed, or hunted like wild beasts, they are being protected and helped, is really touching.

The people of the Bukidnon towns, far from having experienced hunger, had food to sell. They are now raising corn most successfully. The stalks stand 10 to 15 feet high and produce one to three large ears each. Both Filipino and imported Indian cattle are doing splendidly. Bukidnon is capable of producing draft animals and beef cattle sufficient for the entire Archipelago.

CONDITIONS IN BUKIDNON.—When the territory inhabited by the Bukidnons was cut off from Misamis, these people were suffering more severely at the hands of their Filipino neighbors than were the people of any other non-Christian tribe in the Philippines. They were, in many instances, robbed of their coffee, cacao, hemp, and gutta-percha, or were compelled to sell these products at absurdly inadequate prices. No provincial governor had ever visited their country. Their settlements were practically without government. There was, therefore, no check upon the rapacity of those who plundered them. Many members of the tribe who had been baptized and had adopted a civilized life were taking to the hills. Such villages as existed were filthy and insanitary. No food crops were grown in their vicinity. Indeed, the people did not believe that the rich prairie soil surrounding their villages would produce crops. There was not a bridge or a culvert in the subprovince, and travel was often rendered impossible by streams in flood. All agricultural products were necessarily transported on pack animals over excessively bad trails. There was not a mile of road in the subprovince.



OPENING UP COMMUNICATION IN BUKIDNON

A typical bridge built entirely by Bukidnon men.

Now, the Bukidnons have been taught the value of their agricultural products and for the most part insist on receiving it when they sell. They are governing their own settlements and doing it well. Their houses are neat and well-kept: their yards fenced, clean and usually planted in useful crops. The streets and plazas of their villages are clean and well drained. Each important village has its well attended school. Grassy prairie lands have been converted into rich cultivated fields. Excellent low-grade trails connect the more important villages, between which telephonic communication has also been established. A highway passable for automobiles is being pushed toward the subprovincial capital from the coast. On this route alone there are more than one hundred bridges and culverts, and travel is not interrupted by the heaviest floods. The people are prosperous, contented and more than friendly, yet much remains to be done.

Along the Cagayan River and elsewhere near the Misamis boundary they are still often ill-treated by their Filipino neighbors. Unscrupulous municipal officials take advantage of their ignorance and timidity to compel them to pay *in Misamis* taxes which they do not owe. By one expedient or another they are deprived of their cultivated lands. The following instance is typical of what only too often occurs. A long-haired man from the forest who, by hard work had established a coffee and hemp plantation, made a trip to the coast to sell his products. Ignorant of the language there spoken, he fell into the hands of an unscrupulous trader who told him that he needed a business partner in town who would sell the products of his plantation in the hills, thus saving him the expense and trouble of long journeys to the coast. Pleased with the idea, the wild man signed a document drawn up by his rascally new acquaintance. It purported to be a partnership agreement. It was in reality a bill of sale for his place!

The wild man, unassisted, is absolutely helpless in the courts. It will, I fear, be necessary to employ the services of a competent lawyer to protect these "heathen" from their "Christian" neighbors.

DEVELOPING THE PHILIPPINES

The *Manila Daily Bulletin* reports that a company has been organized at Cheyenne, Wyoming, with a capital of P.150,000 to aid in the development of Philippine industries.

Some of the leading capitalists of the state of Wyoming are interested in the project and stand ready to increase the present capital of the company, upon favorable report by their representatives who are visiting the Philippines to look over the conditions of the hemp, copra and sugar industries, make report to their principals and at the same time take cognizance of other neglected industries throughout the archipelago.

Cook's Tourist Agency has opened a branch in Manila. This is an indication of the increasing attention that is being given to the Philippines and the fact that Manila and the Philippines in general will henceforward be included in the itineraries of the large tourist parties conducted by Cook's is a matter for gratification. The good work of advertising the potentialities of the Philippines will be extensively developed as a result of the establishment of Cook's branch.

The American Trading Company has decided to go into the machinery business on a large scale in the Philippines. The machinery department of the company's business will be under the supervision of Messrs. Stuart S. Harvey, R. Naess and J. J. Naugle.

THE FAR EASTERN REVIEW

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DEVELOPING THE PHILIPPINES

In nearly every issue of the FAR EASTERN REVIEW, appear reports of well-capitalized organisations having been formed in the United States for the purpose of developing one or several of the industries of the Philippines. This is a most significant mark of progress. It has often been pointed out that there is no surer sign of belief in a country's future than the investment therein of foreign capital. For reasons that are sufficiently well-known, the investment of American capital in the Philippines has been retarded. The FAR EASTERN REVIEW feels a little natural gratification in being able to record that the capital, which can be so profitably employed in the Archipelago, is now finding its way thither. For years this paper, with its contemporaries, in the Philippines, has been insisting upon the immense value of the Islands as a field for legitimate investment, and it would now appear that the spade-work of the past is proving productive.

In this issue, the reader will find additional evidence of the successful efforts that are being made by the Insular Government to secure the moral and material well-being of the Philippines and the Filipinos. The article on the Wild Tribes of the Philippines is a record of work from which wonderful moral results are being obtained. But, simultaneously, work in the direction of improving communications, dwellings and so forth is being steadily carried on. Soon it may be hoped the people at home will awake to a still more vivid realization of the potentialities of the Philippines, and that a supply of capital will flow into the country sufficient fully to develope its immense resources.

We have already drawn attention to the establishment of the American-Philippine Company of which Mr. Edward H. Fallows of New York is the President. The formation of this concern which has millions of dollars behind it, and the fact that the Mr. Fallows and a large number of well-known financial men considered that it was worth while personally to visit the Islands, show that the propaganda and publicity work of the past have borne good fruit. The visits of men such as these are of infinite value to the Philippines. The more that is known of the immense possibilities of the Islands, and the more widely that knowledge is dessiminated, the better. There is no "gold brick" business about encouraging capitalists to invest their money in the Philippines. It is only the absence of money that has prevented its progress, great as it has been, from being greater. Every dollar invested in legitimate enterprises in the Islands has as good a chance of fulfilling the proper function of a dollar—of growing and multiplying—as in any other part of the world. And if we say a better chance we think that we will be borne out by those who know the Philippines best.

CHINA'S NAVY

A serious effort is to be made to put China in possession of an efficient navy. Of course, during the past year, any movement in this direction has been blocked by the absence of money, the Provisional Government not even having possession of sufficient funds for its ordinary administrative expenditure. It has been recognised, however, that China, in view of her immense coast line and internal waterways, must have an adequate naval force. As a result of a conference between the Minister of the Navy, Liu Kuan-yung, the Vice-Minister Tang, the Senior Naval Advisers and the Departmental Chiefs, certain measures have been decided upon with a view of improving the Naval Administration. These consist of the following:—

(1) A naval fund campaign to be started in order to secure contributions from the people in the Provinces and in the Southern Islands.

(2) To enlarge the Navy, to secure really efficient officers and men and to weed out naval men of the old type.

(3) To reorganize the Fukien Navy Dock, to make it the central dock for the repair of all naval vessels.

(4) To establish a big central manufactory for machinery.

(5) To increase the number of naval academies and colleges.

(6) To open up good naval harbors and to secure a good naval base.

These recommendations have to go to the National Council for approval. It seems a pity that it should be necessary to trust to voluntary contributions for the maintenance of China's Naval Force, and it is to be hoped that the reorganization of the finances will render dependence upon these outside contributions unnecessary in the near future. The proposal to enlarge the navy may be regarded with suspicion by those who fear lest China should become one of the military nations, but regarded without prejudice, it must be admitted that the present pretence at a navy is not in keeping with the role that China may fairly aspire to play in the Far East.

The other recommendations deserve support and show that the Ministry of the Navy has a clear realization of the necessities. It may be some time before China can hope to have a navy of any

consideration, but that need not prevent her laying the foundation at the earliest possible moment.

U. S. RAILWAY RECEIPTS FOR OCTOBER

The receipts and the expenses of the steam railways for the month of October, 1912, are greater than for any other month in their history. Net operating revenue, which is the gross income before anything has been taken out for taxes and rentals, interest on bonds, appropriations for betterments or dividends, averaged $15.71 per mile of line per day, which contrasts with $13.74 for October, 1911, an increase of $1.97. This is an increase per mile of line for the month of $61.13, or 14.4 per cent.

The monthly summary of the Bureau of Railway Economics, compiled from the reports of railways to the Interstate Commerce Commission, covers for October 220,636 miles of line, or about 90 per cent. of all of the steam railway mileage of the United States. The aggregate net operating revenue for this mileage was $107,440,518, which is greater by $14,870,125 than that for October, 1911. The increases were due in greatest proportion to the freight traffic, which is always greater in October than in any other month of the year.

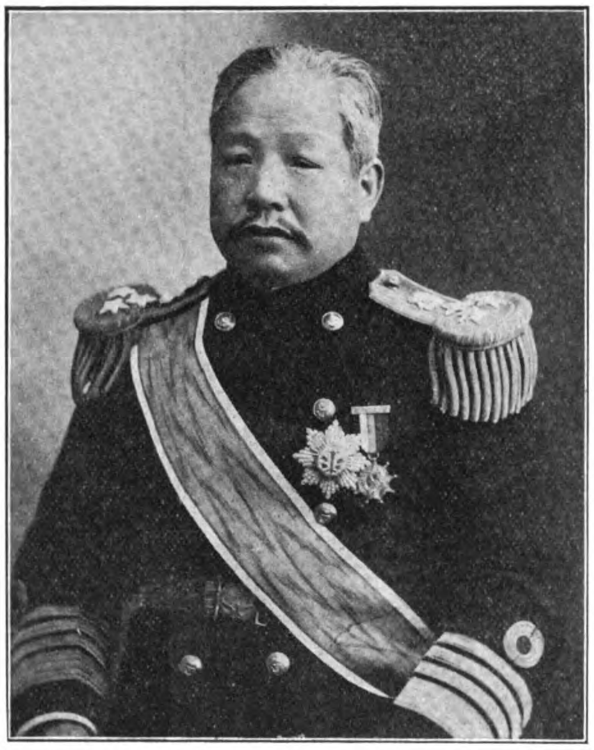
CHINA AND THE LOAN

THE LONG PROTRACTED NEGOTIATIONS

We have refrained from writing much in regard to the Six Power Loan, mainly owing to the clouds of uncertainty which over-hung those hapless negotiations. Just before the close of the old Chinese year, it was confidently expected that the new year would see the Loan Agreement signed and the Chinese Government relieved from its financial embarrassments. Had it rested solely with the bankers, there is reason to believe that there would have been no further difficulty. But the diplomats marched in. France took exception to the appointment of Herr Rump, as foreign head of the Salt Gabelle and from that time on, the diplomats took the matter out of the hands of the bankers. A suggestion was made that there should be two advisers for each post, but this was rejected, as was the proposition that there should be a Briton at the head of the Salt Gabelle.

Originally the idea was that the heads of the departments which came within the scope of the Loan Agreement should be chosen absolutely irrespective of their nationality. The French objection raised at the last moment has introduced a political element. It will be generally regarded as deplorable that the fate of a nation like China should depend upon the settlement of the petty jealousies of the Powers which profess to be friendly. Sympathy must be extended to China in this connection. She had agreed to all demands and was ready, with the bankers, to sign the Agreement when the diplomats stepped in and prevented her from getting the money of which she was so badly in need.

A great deal has been written purporting to give the substance of the Big Loan Agreement. It would seem desirable therefore at this stage to give an accurate summary of the Agreement.



LIU KUAN-YUNG

MINISTER FOR THE NAVY

The amount to be lent was £25,000,000 sterling, and the loan was to be devoted to general reorganization and to administrative purposes. China was to issue Gold bonds for this amount.

The bankers were authorized to issue either in one amount or in series at their option, gold bonds bearing interest at the rate of 5½% for the full amount.

The loan was to be known as "the Chinese Government five and one-half per cent. reorganization Gold Loan."

The loan was to be used for the following purposes :—

(1) Payment of liabilities due by the Chinese Government.

(2) Redemption in full of outstanding Provincial loans.

(3) Provisions for payment at due date of liabilities of the Chinese Government as they matured, including foreign claims for damage and losses during the Revolution.

(4) Disbandment of troops.

(5) Current expenses of administration.

(6) Reorganization of the Salt Administration.

(7) Other administrative purposes mutually agreed upon.

The loan was to be a direct liability and obligation of the Chinese Government which was to pledge its good faith and credit for the proper performance of all engagements.

The loan and any advances connected therewith was to be secured upon the revenues of the Salt Administration subject to previous loans and obligations and it was to have priority over all future loans on these revenues until redeemed. It was provided that no other loans, which would lessen or impair its security over the Salt Administration revenue, should be created, and also that if at any future time the Maritime Customs revenue should exceed the amount required to meet existing obligations, that such surplus should be applied in the first instance to the service of the reorganization loan, the Salt revenue surplus being thus made available for the general purposes of the Government.

The Government undertook to take immediate steps to reorganize with foreign assistance, the system of collecting the Salt revenues in the following manner :—

A Central Salt Administration was to be established at Peking under the control of the Minister of Finance. This Central Administration was to consist of a chief inspectorate of Salt revenues under a Chinese chief inspector and a foreign associate chief inspector who would constitute the chief authority for superintending the issue of licenses and the compilation of reports and returns of revenue. There was to be a branch-office of the chief inspectorate, in each salt-producing district under one Chinese and one foreign district inspector, who were to be jointly responsible for the collection and deposit of the Salt revenues. Periodical reports of all receipts and disbursements were to be issued by the chief inspectorate and the release of salt against payment of dues in any district could be made only under the joint signatures of the Chinese and foreign district inspectors. These revenues were to be lodged in a "Chinese Government salt

revenue account" with banks approved by the banks. This account could only be drawn upon under the joint signatures of the chief inspectors.

If the interest and principal should be in default at due date after a reasonable period of grace, the organization was to be incorporated with the Maritime Customs.

With the reorganization of the salt gabelle was proceeding, the provinces of Chihli, Shantung, Honan and Kiangsu were to pay monthly into the banks the funds necessary to meet the service of the loan. These payments by the provinces were secured as a first charge upon Central Government taxes of these provinces and the Central Government was to supply evidence that the provincial authorities officially recognized the obligation. After the revenue collection of the Salt Administration became sufficient to cover the service of the loans, the monthly contributions from the provinces were to be suspended. When the revenues of the Salt Administration had been maintained for three successive years at a sufficient figure, the provincial liabilities were to be finally released.

The term of the loan was to be fifty years and repayments were to commence with the sixteenth year. After the lapse of fifteen years, the Chinese Government could give notice to redeem or convert the outstanding amount.

The price of the loan was to be the price of the issue to the public less a deduction by the banks of 6% of the nominal value of the bonds. The issue price in London was to be not less than 96½% securing to China a net price of not less than 90½ for the entire loan.

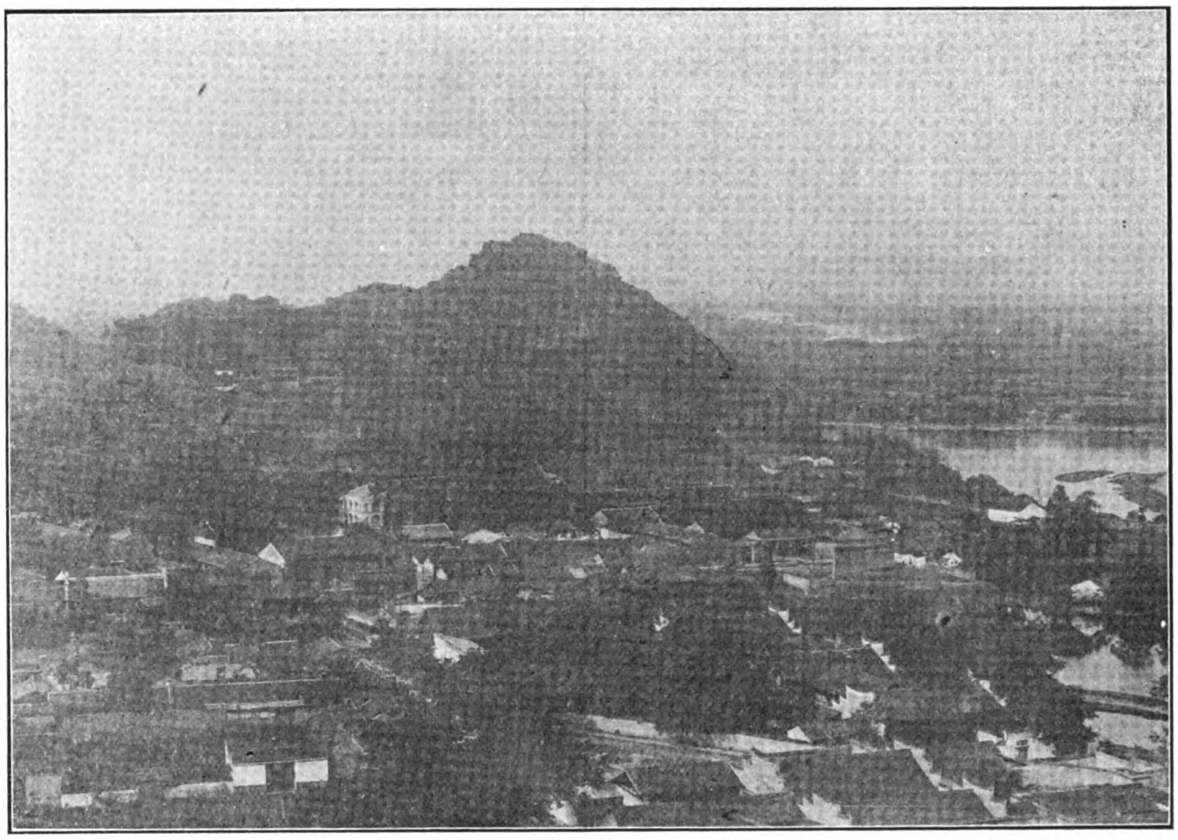
The Chinese Government undertook to put at once into effective operation the Accounts and Audit department. The Chinese and foreign Directors of the Bureau of National Loans were jointly to sign all requisitions for loan funds.

The usual provision for postponing the issue of the loan in the event of any political or financial crisis was included.

In most other respects the lines of previous Loan Agreements were followed.

TRADE AND RESOURCES OF KWANGSI PROVINCE

[FROM THE REPORT OF CONSUL GENERAL LEO A. BERGHOLZ, CANTON, CHINA]



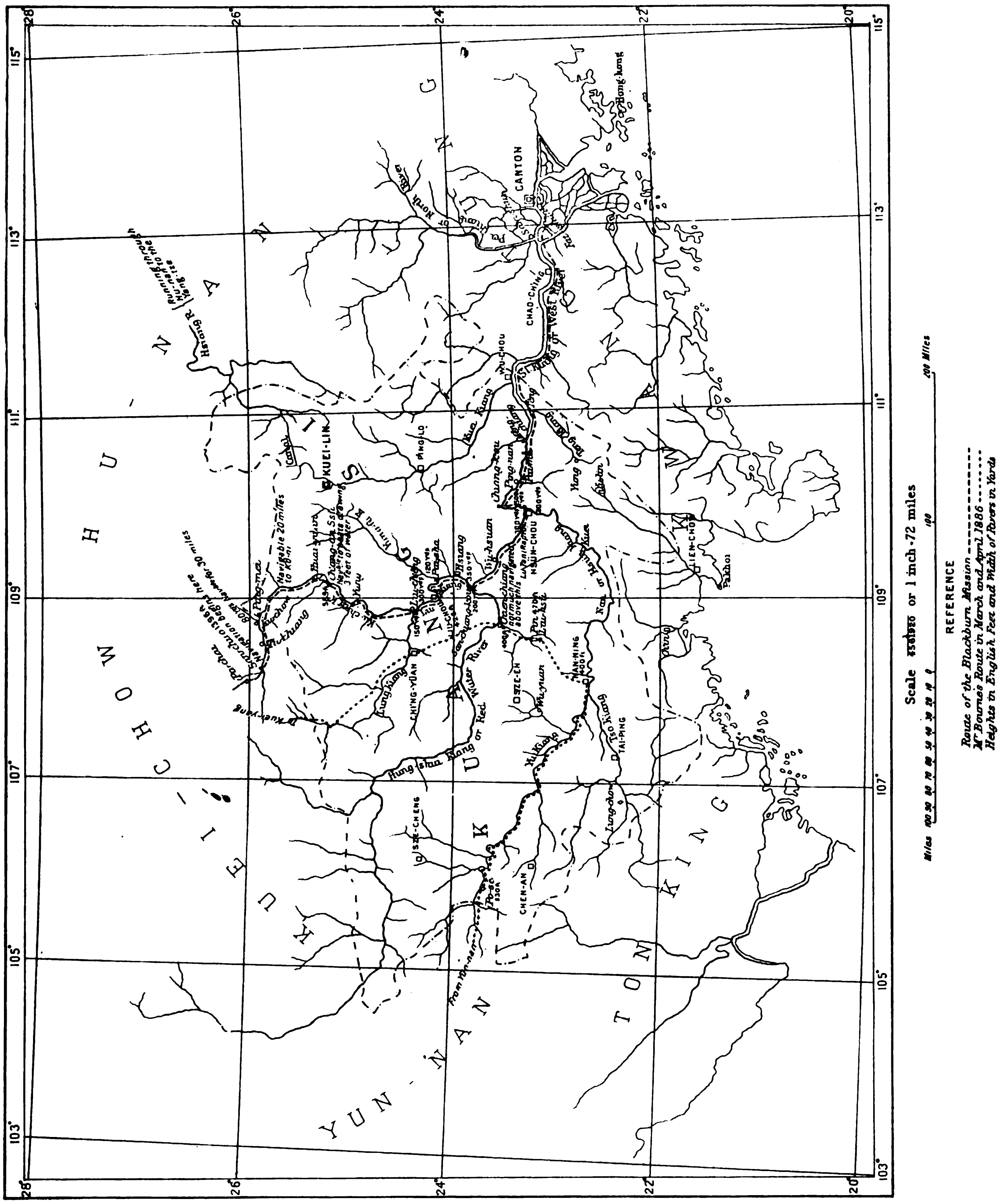
VIEW FROM THE NORTH GATE OF KWEILIN

The Province of Kwangsi, in western interior China, has an area of 77,220 square miles and a population of 5,140,000. Its largest city is the provincial capital, Kweilin-fu, on the Kweikiang, having a population of some 80,000. The chief trade center is Wuchow, a prefectural city of 65,000 inhabitants, on the Sikiang, near the Kwangtung border. Other important commercial and industrial cities are Nanning-fu, Liuchow-fu, Lungchow-t'ing, and Poseh-t'ing. Owing to the mountainous character of the Province, little use has been made of its rivers (the Sikiang or West River and its tributaries, the Nankiang, the Liukiang, and the Kweikiang) for irrigation purposes.

Mining, Agriculture, and Manufacturing

The isolated position of Kwangsi and the natural difficulties of travel within its borders have, to a large extent, thrown a veil over its resources. The Province is credited with deposits of gold, silver, and antimony, but its coal mines are the only known factors in its mineral wealth. A superior grade of coal has been mined for years by native methods and in 1909 a few shipments of it appeared at Canton. The forests of maple, ebony, teak, and other timber have been better worked and supply one of the chief sources of income to the people.

Agriculture is profitably carried on in the valleys and on the lowlands of the



THE RIVER SYSTEM OF KWANGSI PROVINCE

southern and eastern districts. The principal natural products are aniseed camphor, rice, beans, indigo, sugar, potatoes, olives, groundnuts, cotton, bamboo, and other timber, false gambier, cassia, corn, fruit, and silk. Opium was never widely grown in the Province. Poultry, pigs, and cattle are extensively raised for export.

Kwangsi has no important manufacturing industry. The weaving of silk, once carried on to some extent, has dwindled to insignificance. At the present time the manufacture of firecrackers and fireworks, joss sticks, iron pans, pottery, the tanning of leather, and the preparation of finished products from the produce of the soil and forests constitute, in general, the range of its industries.

The industrially backward condition of the people of the Province compels them to depend upon outside sources for a large number of important articles, among which may be mentioned cotton piece goods and cotton yarn, woolen goods, cotton and woolen mixtures, silk piece goods, raw cotton, metals, coal, cigarettes, aniline dyes, enameled ware, flour, ginseng, window glass, hosiery, lamps and lamp ware, matches, condensed milk, needles, kerosene, india rubber boots and shoes, soap, umbrellas, umbrella frames and parts, alum, bêche-de-mer, straw mats, medicines, and a certain amount of timber.

Foreign Trade of the Three Open Ports

Exclusive of treasure, the total foreign 1909 trade of the three open ports of Kwangsi that passed through the Imperial Maritime Customs is shown in the following table:

Ports.	Imports.	Exports.	Total.
Lungchow........	$120,653	$77,425	$198,078
Nanning	1,461,665	1,152,733	2,614,398
Wuchow	5,949,504	2,269,253	8,218,757
Total	7,531,822	3,499,411	11,031,233

The values given in this table are not those of exports originating solely in Kwangsi nor of imports consumed entirely in the Province, but include the value of a large amount of native goods produced in neigbouring territory, but exported through the ports of Kwangsi, and of a large amount of foreign goods imported for distribution in Kwangtung, Kweichow, Hunan, and Yunnan. The value of the foreign imports sent under transit pass to these Provinces in 1909 was as follows: Kweichow, $2,411,061; Yunnan, $235,704; Kwangtung, $123,872; Hunan, $909; total, $1,771,546.

Lungchow's Trade—Motor Boats for River Use

The port of Lungchow, or Lungchow-t'ing, the smallest of the three ports of Kwangsi open to international trade, is situated on the Tsokiang, in the extreme southwestern corner of the Province, and has a population of 12,000. It was opened to foreign trade some 20 years ago and, for a time, a growing importance was predicted for it. It has failed, however, in a large measures, to justify this prediction, mainly because of the abandonment of the project to connect it by rail with Tonkin and Nanning-fu. The foreign trade of Lungchow amounted in 1909 to only $198,078, and consisted entirely of importations from and exportations to Tonkin, through Langson, Thatke, and Caobang, the three places in the French colony having direct trade relations with the port. Trade is practically controlled by Chinese merchants.

The district in which Lungchow is situated is well watered and comparatively productive. Corn and rice are grown in all parts of it, and sugar, potatoes, beans, indigo, groundnuts, aniseed, and camphor less generally throughout. There are no important mines and no large manufacturing industries either in the city itself or in its neighbourhood.

The greatest drawback to the trade of the district has been, in the past, and still is, the imperfect means of communication which it possesses. It has at its service, for direct trade with Nanning, Wuchow, and Kwangtung, only the Tsokiang; and for direct trade with Tonkin, only the two small streams which combine to create the Tsokiang. For the rest, it has to depend upon porters, of whom, in 1909, there were 2,674 engaged in the frontier trade. Several smaller affluents of the Tsokiang flow north and south through the district and are of some assistance to its distributing trade. The navigation of the Tsokiang to Lungchow is possible only for shallow-draft vessels, and by these for only a part of the year. The institution of a motor-boat service to Nanning has been considered, and the project seems to promise to become an actuality. Except during the dead low water of winter an all-year service for shallow-draft steamers or launches could be easily maintained. Practically nothing, however, has been done to start such a service and the trade of Lungchow remains stagnant. The opening of Nanning to foreign trade in 1907 was expected to stimulate the commerce of its sister mart, but, if it has affected Lungchow at all, it has done so only adversely.

Prosposed Motor-Car Service—Lungchow's Exports Growing

That trade is not an impossibility without railway service is shown by the fact that the value of the annual imports and exports at Lungchow has nearly trebled since 1900, but, at the same time, the immense service which would be rendered by a railway to the trade not only of Lungchow but of all the Province is patent. A recent suggestion which is not impracticable is the institution of a motor-car service between Lungchow and Nam Kwan, the present northern terminus of the railway from Hanoi. The commencement of this service would be contingent upon the successful operation of a line of launches between Lungchow and Nanning, and would, it is claimed, constitute, next to the extension of the railway to Lungchow, the best solution of the difficulties that hamper and restrict the trade of the port. The proposed service would handle passengers, light freight, and parcels, while the heavier and more bulky cargo would continue to come and go by water. The present existing roads would require only moderate improvement to make them serviceable for motor cars. It is doubtful, however, whether this suggestion will receive any consideration from the people of Lungchow.

Analysis of the trade of Lungchow with foreign countries for the five years from 1905 to 1909 shows that there has been no significant increase in the import trade (value $120,653 in 1909), but that the increase in the export trade (value, $77,425 in 1909) has apparently been substantial. The trade, both export and import, of this port is practically all with Tonkin. The most important single article imported is Tonkinese cotton yarn, which is creating an excellent market for itself. It appeared in Lungchow for the first time in 1903, with an importation of 23,867 pounds, and increased to 165,733 pounds in 1909. Its superior quality and proximity to the market places it beyond competition of Indian and Japanese yarns. Foreign umbrellas, now a staple article of import into Yunnan, found their way into Lungchow for the first time in 1910.

Nanning's Lack of Transportation Facilities

The port of Nanning, or Nanning-fu, opened to foreign trade in 1907, is situated on the left bank of the Nankiang, at the junction of the Yukiang and Tsokiang, 368 miles above Wuchow and 250 miles below Lungchow. It is a prefectural city of 25,000 inhabitants and ranks as the second largest of the three open ports of Kwangsi Province.

The city lies in the center of a wide and fertile plain in a sharp bend of the river, and is accessible by the ordinary river launch only during the very irregular times of high water.

The major part of the population lives in suburbs outside the city walls, and nearly all business is transacted there. A foreign settlement with all the conveniences that a foreigner in this country can reasonably expect has been laid out below the wall. Land here is held on 30-year leases, and the management of settlement affairs is in the hands of a special board of city officers.

A serious obstruction to the speedy development of the trade of Nanning is the difficulty of river navigation. In addition to 22 rapids the river bed between Nanning and Wuchow is strewn with countless rocks. Therefore, unless extensive river improvements are carried out, the terminus of all heavy steam traffic must remain at Wuchow. Two railway lines into Nanning have been proposed, but nothing is now heard of them.

A flying survey of the waterway between Nanning and Wuchow was made by foreign surveyors in the employ of the Imperial Maritime Customs, but nothing definite has followed. A regular but limited launch service has been maintained with Wuchow since 1907. The motor boats employed on this line average 45 tons, with a draft of 2 feet laden and 1 foot 7 inches in ballast. They make from 8 to 10 knots an hour and take from 3½ to 4½ days to make the trip up. The downward trip takes from 1½ to 3 days, depending on the state of the water.

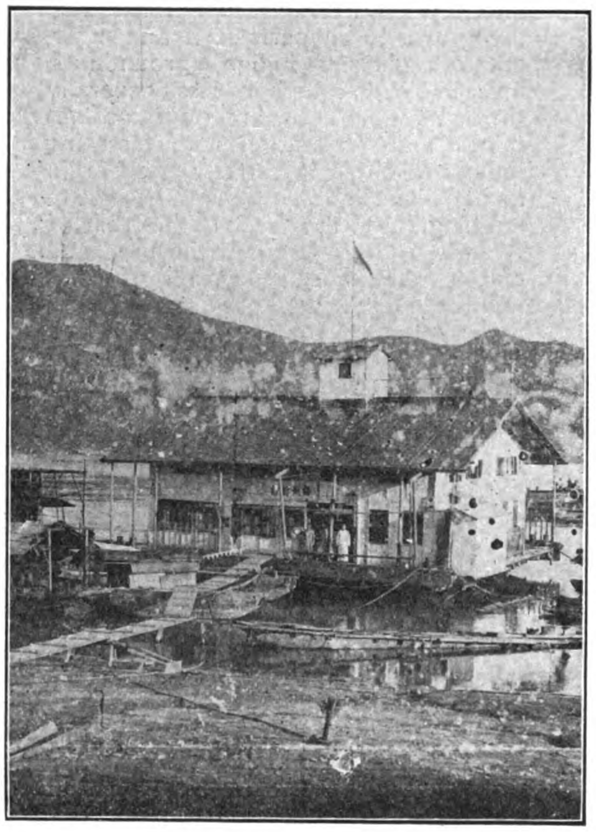
Nanning's Industries—Progress Along Western Lines

The industries of Nanning are limited and of no great importance, the principal product being firecrackers, the average annual output of which is about $240,000. The trade of the city is entirely with other Chinese ports, principally Wuchow, and the port has no direct dealings with foreign countries. The establishment of foreign agencies in Nanning to carry on a direct trade with the Chinese merchants of the district would eliminate the Wuchow, Canton, and Hongkong middlemen and probably effect a decided increase in the trade of the port.

Nearly all business transactions here are carried on by the check system, owing to the scarcity of ready money. These checks pass from hand to hand in local transactions with repeated indorsements. Interest rates formerly went as high as 16 per cent per month, but are now legally limited to 6 per cent per month. What little actual currency there is is made up of Hongkong and Canton 10 and 20 cent (Mexican) pieces, Hupeh small coins, French piastres de commerce, and a sprinkling of the dollars commonly seen in South China. The unit of trade calculation is the local (Yung-p'ing) tael.

Many signs of changes on Western lines are already apparent in Nanning. Policemen in uniform and with a short baton at their sides are stationed on the streets and at all the gates. A fire brigade with serviceable engines has been established, and street lighting has been started.

Though all these institutions are still incomplete, from a foreigner's point of view, they mark a start and show that the necessity of introducing foreign methods has been recognized. In educational matters reforms are also noticeable. Five minor, one middle, and one normal school have been opened, the first mentioned being established in temples, while for the last mentioned a building in foreign style has been erected; but they all find difficulty in securing competent teachers. Besides these, a foreign school was opened at Nanning in 1902 by the French Frères Maristes, and in 1909 a new school, with an initial attendance of 450, was opened by the superintendent of customs and a public school for girls established by the gentry, with the support of the local officials.



STEAMER STAGE AT WUCHOW

Nanning's Trade in Healthy Condition

In the last few years the great decrease in the native opium traffic has seriously affected the trade of the port. Formerly Nanning was a center of barter for Yunnan and Kweichow opium and foreign goods. As many as 8,000 chests of opium are said to have formerly thus changed hands at Nanning annually. The traffic in opium was first diverted, to a large extent, from Nanning to other routes by an increase in the taxes levied on the commodity in Kwangsi, and then further lessened by the virtual suppression of poppy culture in the districts where opium formerly was grown.

The figures for 1908, 1909, and the first half of 1910, however, show the trade of the port to be in a healthy condition, with evident signs of growth. These years were for Nanning, as for the greater part of Kwangsi Province, ones of comparative prosperity.

The market for cotton piece goods shows a steadily growing demand, and it is possible that when the figures for the full year of 1910 are available they will develop no falling off in the importations of this staple. Cotton yarn, however, declined sharply in 1909 and 1910. The receipts of native cotton homespuns, principally from Canton, and of woolen and cotton mixtures increased in 1909, but disappeared during the first half of 1910. Woolens, on the other hand, were in less favor in 1909 than in the previous year. In only two items, woolen blankets and rugs and Spanish stripes, were the figures for 1909 above those for the preceding year, while cashmeres alone appear to have done better in 1910 than in 1909. Silk piece goods maintained throughout the period a steady increase in the amounts annually imported.

Nanning's Imports and Exports

Foreign and native metals showed some improvement, and the same may be said of foreign sundries. Foreign medicines, condensed milk, cigarette paper, singlets and drawers, socks, stores, umbrellas, and umbrella parts and fixtures, all improved in 1909 and show a steady demand in 1910. American kerosene jumped from 88,700 gallons in 1908 to 211,750 gallons in 1909 and 114,695 gallons for the first two quarters of 1910, while the imports of Sumatra oil, its only competitor, for the same years were, in gallons: 1908, 165,900; 1909, 297,620; and January to June, 1910 117,925.

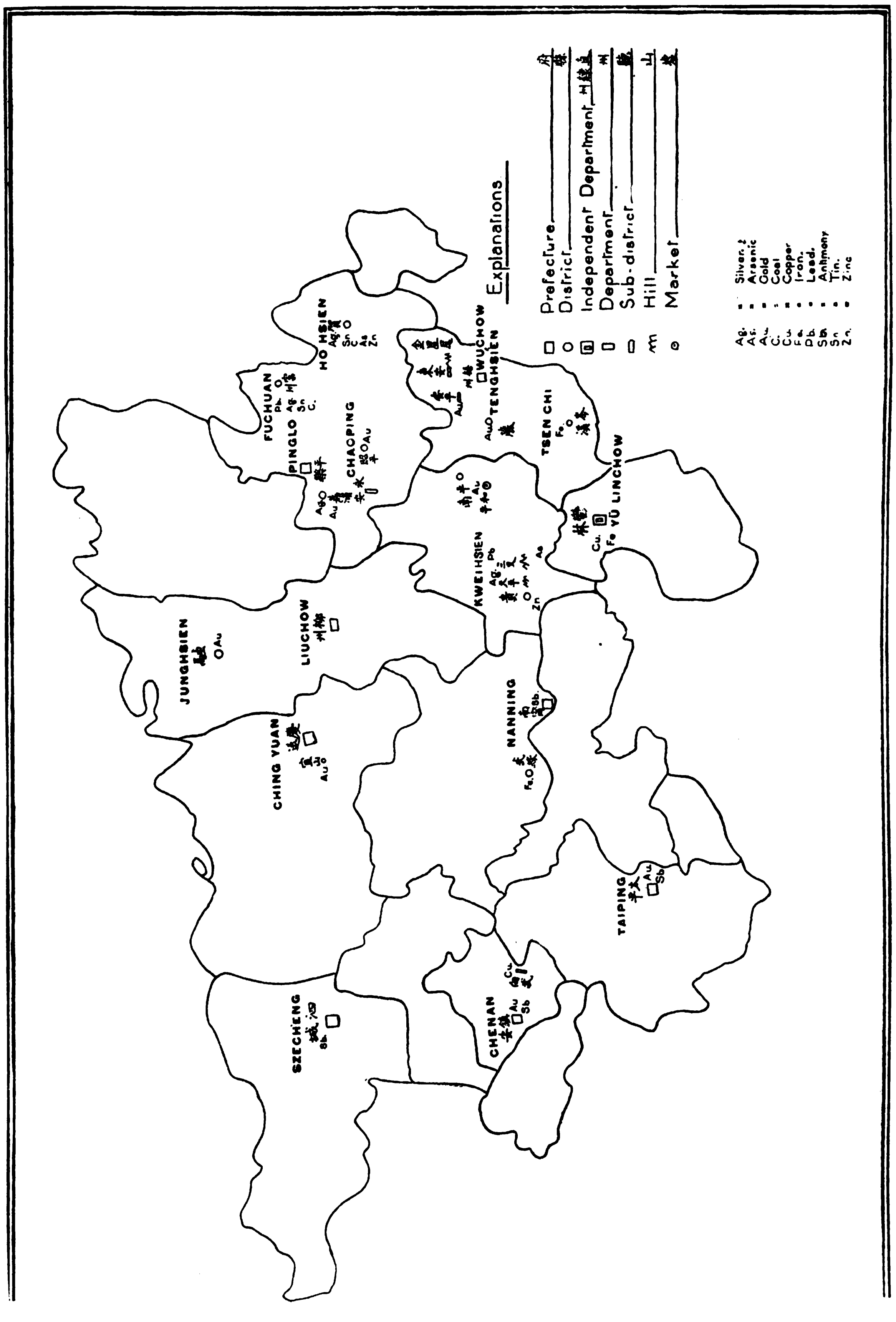
The more important exports all show a steady increase in the amount during 1908, 1909, and the first six months of 1910, with the exception of star aniseed, which fell off sharply in 1909, on account of the unsatisfactory state of the foreign market, but recovered to a large extent in 1910. Aniseed oil increased from 71,200 pounds in 1908 to 143,600 pounds 1909, and then dropped to 32,533 pounds in the half year ended June 30, 1910. Beans increased over 6,000,000 pounds in 1909 as compared with the previous year, and the shipments for the first months 1910 amounted to more than two-thirds of those for the full year of 1909. Camphor declined in 1909 and disappeared during the first half of 1910.

Leaf tobacco declined in 1909, but the figures for the first half of 1910 are far above those of any full year on record.

The falling off in firecrackers and fire-works is attributed to a growing competition by similar products manufactured in Canton, in the preparation of the paper for which alum is used to neutralize the smoke. The use of alum for this purpose in Nanking has made but little headway, the manufacturers claiming that it is too expensive to allow them the customary profit on their goods.

The following table shows the value, in American gold, of the trade of Nanning, exclusive of treasure, for the last nine months of 1907 and the two years 1908 and 1909:

Year.	Imports.	Exports.	Total.
1907..	$648,306	$571,927	$1,220,233
1908..	1,351,612	858,250	2,209,862
1909..	1,461,665	1,152,733	2,614,398



SKETCH MAP ILLUSTRATING SOME KWANGSI MINING AREAS

Wuchow's Foreign Trade

Wuchow is the most important port in Kwangsi, and its principal trade center, controlling by its situation practically the entire trade of the Province with Canton and Hongkong, with the exception of a small portion which enters by way of Pakhoi, on the Tonkin Gulf. The city has a native population of 65,000 and a foreign population of not more than 30. Foreign business houses have been slow to establish themselves here and the trade is still in the hands of Cantonese merchants, having their main offices in Canton or Hongkong and working with the big houses and banks of Canton, Fatshan, and Samshui.

As might be expected from this condition, the port has no direct commerce with foreign countries, its trade being entirely with Canton and Hongkong, with the exception of a small trade with Nanning and Lungchow. Wuchow merchants send their agents into the interior to dispose of their foreign imports for native produce, practically by barter, and bring the produce thus secured to Wuchow under transit pass and export it to Hongkong.

The district served by Wuchow comprises the larger part of Kwangsi and and sections of Yunnan and Kweichow. The combined area of these Provinces is about 291,120 square miles and the population about 25,000,000, about half of which draws its supplies from Wuchow.

The gross value of the port's trade that passed through the Imperial Maritime Customs at Wuchow for the calendar year 1909 was $8,218,757, made up of foreign imports $4,871,101, native imports $1,078,403, and native exports $2,269,253. The re-exports aggregated $1,809,341, thus making the net trade of the port for the year $6,409,416.

With the establishment of the Imperial Maritime Customs at Wuchow, foreign imports were laid down for the first time in Kwangsi upon the payment of a single import duty. The extent of inland taxation in Kwangsi formerly

may be grasped in some degree when it is known that in 1897, immediately before the port was opened, a piece of 10-pound gray shirting, after paying treaty and import duty at Canton, paid transit and other inland charges between Canton and Liuchow amounting to no less than 30 per cent *ad valorem*.

Taxes—Lack of Transportation

The trade of Wuchow still suffers from excessive taxation, but not to an extent comparable with that which it was forced to endure in its early and pretreaty days, and from currency conditions, the general poverty of the district which it serves, unrest in the interior, and the lack of favorable means of communication with the various inland points which it supplies. The water communication, by the West River, which Wuchow enjoys with Canton, 250 miles distant, and with the West River delta, while not perfect, is yet easy and safe and sufficient for the needs of its trade.

Neither Kwangsi nor Kweichow nor the section of Yunnan supplied by Wuchow has any railways. The existence of a Kwangsi provincial railway company is made known whenever any suggestion is made that foreign capital be employed to build railways in the Province; further than that, however, it has accomplished nothing to date. Three lines of railway for Kwangsi have been projected by the Ministry of Posts and Communications, but no one of them has as yet progressed beyond the "projected" stage.

Mineral Resources Not Developed

Coal is mined in the vicinity of the port, but only by primitive methods and in small quantities. It is of indifferent quality and employed principally for house-heating purposes. The river shipping is supplied by imported coal, mostly Japanese. Further inland occasional deposits of a better quality of coal are met with, but the output has reached no importance as an article of commerce. Tin mines are found in several places in the Province, where the ore is worked on a small scale by the natives. The smelting is done on the spot and the finished product comes to Wuchow for export as tin slabs. The high price which antimony reached on the Hongkong market some years ago led the provincial officials to open a smelter in Wuchow, but the almost immediate pricking of the boom threw the smelter out of work and it has remained idle ever since.

A concession was granted to a company composed of wealthy Cantonese, capitalized at $2,000,000, some three years ago, to work the mines in the Tienying hills, near Kweihsien. The mines have been carefully prospected by a native mining expert educated in the United States, who reports that, in the district examined, there are no less than 20 veins of silver producing, on an average, an ore that will clean up 10 ounces of silver to each 100 pounds of ore and that, in addition to the silver, there are small deposits of gold, copper, and lead. The concessionaires hope to turn out 100 tons of ore a day and perhaps to connect the mines by an electric trolley with Kweihsien and put on two boats of their own for regular service between that point and Wuchow and Hongkong.

DR. SUN YAT-SEN

Dr. Sun Yat-sen, Director-General of the Chinese National Railway Corporation left Shanghai in the middle of February on a trip to Japan. He has been given the most enthusiastic official and popular receptions and it is confidently hoped that his trip will tend largely to improve the relations between China and Japan. Dr. Sun is expected to return at the end of March.

BIG CEMENT CONTRACT

Awards were made at the bureau of supply, Manila, on January 23, on the big cement bids for the supply of 42,000 barrels or drums of cement for bureau stock. The only bidders for the contract were Messrs. Findlay, Richardson and Company and Messrs. Henry W. Peabody and Company. The award made gives the contract to Messrs. Findlay, Richardson and Compay and amounts to approximately P.231,000. The contract calls for a supply of "Alsen," a German brand of cement, to be delivered at Manila at P.5.24 per barrel, at Cebu P.6.14 per barrel and at Iloilo at P.6.14 per barrel.

DEFIANCE MACHINE WORKS, DEFIANCE, OHIO, U.S.A.

No. 2 Heavy Patent Automatic Spoke Driving Machine.

This Engraving represents the Defiance Machine Work No. 2 special heavy Patent Automatic Spoke Driving Machine, which has been designed for driving spokes in wagon, truck and heavy artillery wheels, driving spokes as large as 5 inches in diameter in wheels from 24 inches to 72 inches diameter.

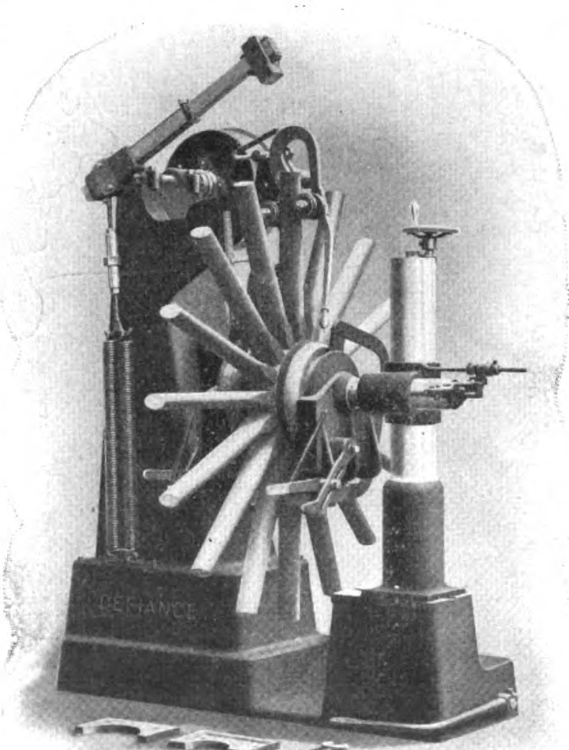
This Machine is used by the leading wheel and wagon builders, who require a machine to cover both medium and extra heavy work. It performs this work more perfectly and at an immense saving over hand labor. It is extremely simple in its operation, and contains many valuable features over machines heretofore used for this purpose.

The Frame is cast in one piece with cored center, making it very stiff and reliable to stand the heavy labor expected from it.

The Bed-Plate upon which the frame rests, is a heavy casting.

The Hub to be operated upon is held at each end in a pair of adjustable saddles having independent vertical adjustments for the length of the spoke and a horizontal adjustment to accommodate the length of the hub.

The Hammer Shaft is of steel, 2 7/16 inches diameter, and it runs in genuine babbitt metal self lubricating bearings, and is driven by a powerful friction clutch which is connected by foot pedal at the base of the machine for starting and stopping the hammer.



NO. 2 HEAVY PATENT AUTOMATIC SPOKE DRIVING MACHINE

When in Use the foot of the operator is placed upon the pedal which immediately engages the friction clutch and instantly starts the hammer, which delivers a blow similar to the swinging of a hammer by hand. The force of the blow is regulated by the pressure applied to the pedal. It will strike the blow heavy or light as desired. By the aid of an ingenious device the frictions are automatically disengaged before the hammer delivers the blow which prevents shock or injury to the machine. The friction acts as a loose pulley when disengaged.

The Graduation of the blows is so quickly accomplished that the stroke of the hammer can be changed after the hammer is started by changing the pressure of the foot upon the pedal.

The Adjustable Gauge is conveniently arranged to guide the spoke, being driven to exact position, returning out of the way when not in use. The dish staff is also furnished to test the work.

The Hammer Helve is attached to the machine by a friction binder, and it is easily removed when desired. The hammer is made of solid Swedes iron.

The Friction Driver is 18 inches by 5 inches, driven by a single 5-inch belt 250 rotations per minute, and it can be belted to from above, below or either side direct from the main line shaft.

Horse Power to drive, 1; floor space occupied, 45 inches by 75 inches.

Further information relative to the many advantages offered by this valuable machine will be cheerfully given by its makers. The Defiance Machine Works, Defiance, Ohio, U.S.A. London Office 60 Queen Victoria St., E.C.

CURRENCY REFORM IN CHINA

A Brief Retrospective Glance

A detailed account of the movement towards currency reform would be too voluminous for the purposes of the present article, but before presenting the report of the Chinese Currency Commission, which we have had specially translated for the Far Eastern Review, it may be of interest to take a brief glance backward. There will be no necessity, however, to go further back than 1904, when the great American authority Professor Jenks prepared an exhaustive report and scheme for currency reform. At that period the Government of China was always willing to accept the assistance of foreign brains in theory, but in practice the reports obtained from foreign experts were for the main part allowed to accumulate dust and the veneration due to antiquity, in departmental pigeon-holes It is not surprising, therefore, to find that no action was taken in connection with Professor Jenks' report until 1907 when the Board of Finance took up the matter and began to gather information from different parts of the Empire. In 1909 a regular Bureau of Currency Reform was established. It collected material and information for several months and at the beginning of 1910 a Currency Reform scheme, upon which the Currency Loan Agreement was made with the Four Nation Group, was devised and Dr. Chen Chin-tao was appointed chairman. It should be pointed out that the scheme upon which the Currency Reform Loan was based was only a part of the entire scheme. It was the first step. The body, at the head of which Dr. Chen Chin-tao acted, was in favour of the Gold Exchange Standard, but before they drew up the scheme, they asked the then Minister of Finance, Duke Tsai, to borrow a sum of Tls. 20,000,000 for the operation of the Currency Reform scheme to establish the Gold Exchange Standard. But the Duke refused, and, therefore, they had only in hand Tls. 10,000,000, and on that account they did not have money to begin with the Gold Exchange Standard. Also, they did not feel that there were Chinese able enough and sufficiently experienced to carry the entire scheme through, consequently, they adopted a plan somewhat similar to the Indian method, except that they did not propose to raise by extraordinary and forcible means the value of the silver coins by 20% or more before adopting the Gold Exchange ratio. The Indian method was to secure uniformity of rupees in the first place and then to close the mints. As no new supply of rupees was then forthcoming, and in consequence of the development of trade and the distribution through the interior of these rupees, the result was a greater demand for the coins. Their value would consequently rise. Generally, it is figured that 20% difference in the intrinsic value of the coins would be enough for the silver to rise in order to secure that the coin would not be exported or melted down. But during the period of closing the mints to force up the value of the coin, the market must necessarily be disturbed. The Indian method of adopting the Gold Exchange Standard requires two separate steps (1) the issue of new coins and securing uniformity of coins and (2) raising their value and adopting the Gold Exchange Ratio. Therefore the market is disturbed twice, especially in the latter period when the mints are closed to raise the value of the coins. This deranges the interest rate of the market, the relative position of debtor and creditor, and disturbs the equilibrium of imports and exports because it favours more imports and reduces exports.

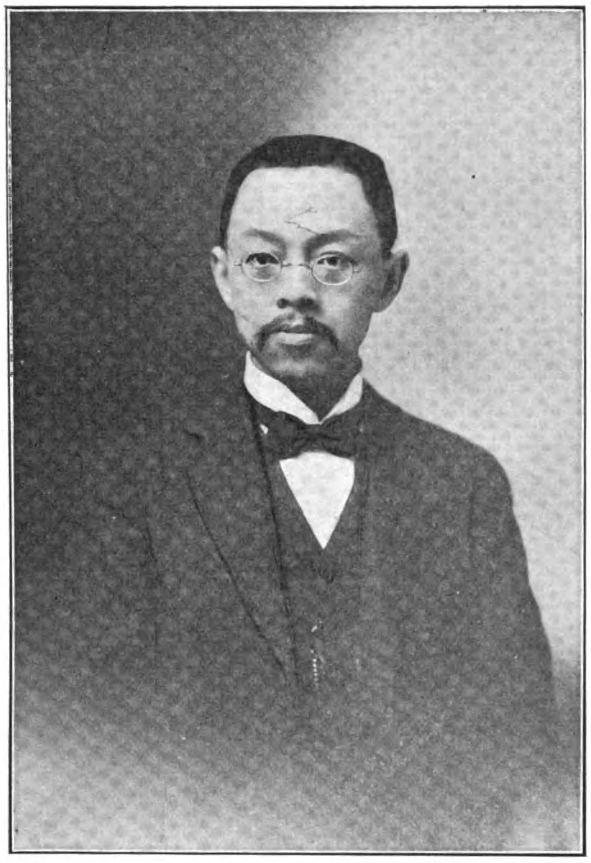
CHOU HSUEH-HSI, MINISTER FOR FINANCE

The whole scheme devised in 1910 was to secure uniformity of coins as the first part, but for the second part, it was not intended forcibly to raise the value of the coins during the period they were being issued.

It was intended to train up Chinese for the exchange business. It was also intended to watch the seasonal variation of exchange and to maintain secretly the high value of the coins by means of the reserve abroad. Whatever variations there might be, this high value would be maintained for 2 or 3 years. During this time many of the silver coins would be withdrawn by the Government and put in the vaults against the issue of paper money. The coins so withdrawn could be either held in reserve or transported to the remoter parts of China. In course of time, the Chinese officials would have gained some experience abroad in regard to exchange business and the value of the silver coin would have been raised high enough according to the natural seasonal variation above its intrinsic value. If China so maintained the value of these coins for 2 or 3 years and then found that this value deviated from the fluctuation of raw silver, it would be known definitely that China had the machinery for maintaining the exchange value of the coin and was strong enough to maintain that exchange value. Then it would be for the Government to announce this Gold exchange value for the Dollar, or if the Government did not like to take this step, they could go on for some years maintaining its value without taking the responsibility of guaranteeing the exchange ratio. But the market would reap the same benefit as from a Gold Exchange Standard, although it was not officially announced. Therefore, this scheme was very safe. The men would be trained up and it would have been proved that the organization was strong enough, before the Government took the serious step of giving a promise to fix the ratio between the silver coin and the Gold. Moreover, the market would not be disturbed twice as was the case in India.

The Indian Government began to fix the Gold ratio when it had barely £6,000,000 sterling gold reserve. Therefore, if the Chinese Government, in reforming the Currency, adopted the scheme of issuing paper money as a substitute for dollars for several years, it would obtain enough to keep up the Gold reserve. This ingenious method would not involve a preliminary promise before the machinery would be completely established.

The association of Sheng Hsuan-huai, generally known to foreigners as Sheng Kung-pao, with the question of Currency Reform, is worth recollecting. Sheng, it is averred, has nothing to learn in regard to "smart" financial methods. It is well known that the greater portion of Sheng's money and that of his relatives was invested in the Hangyeh-ping Company, and that the company could never pay without reorganizing the machinery. Two or three years ago Sheng, it is stated, stood to lose about $1,000,000 per year unless the machinery were renewed. It was next to impossible for him to obtain money, and he required about $20,000,000 more to so equip the Works that he could get them upon a profit making basis. Sheng wished to raise a foreign loan, but the Government deemed that it was dangerous to allow the foreigner to gain control of such a valuable and important property in the heart of China. What was Sheng to do ? It is claimed that he evolved a very ingenious plan. He decided that he would have himself put in charge of the Currency Reform and thus have the Government Bank,



CHANG TSUNG-YUEN, PRESIDENT OF THE CURRENCY REFORM COMMISSION, EX-VICE-MINISTER OF FINANCE

which was to be associated with the scheme, under his hand. During the Currency Reform the Government Bank was to issue notes and would have to have securities to back up the note issue. Sheng saw in this a great opportunity to issue bonds for his company and to get the Government Bank to take them up as security for the note issue. That was his plan. He became Minister for Transportation and was entrusted with the reorganization of the railways. In the loans that he made in this capacity, he made it a condition that rails must be purchased from the Hangyehping Iron Works which would thereby be kept busy for about 4 or 5 years.

Sheng, although Minister in charge of the Currency Reform, had no expert knowledge of the matter, and while he was in charge, he never made any step in the direction of reforming the Currency. He gave his attention solely to the size, form and design of the coins. He thus wasted his time hoping that he would get the Currency Loan and the other financial advantages before he commenced to work. Sheng, it is alleged wanted to use the Currency Reform scheme to save his Hangyehping Company, and this caused the proposal for the nationalization of railways, and this in its turn led to the rising of the people and ultimately to the Revolution.

In regard to the Currency Commission, the labours of which may not prove to be final, inasmuch as another Committee may be formed to report on its report, it is a great pity that the Commission did not have the assistance of Dr. Chen Chin-tao, who was recently appointed Head of the Audit Department. Dr. Chen Chin-tao, while the Committee was holding its meetings, was engaged on important investigations in regard to the Government auditing systems in Europe and America. There is no living Chinese publicist who knows more of the question, and it is to be hoped that if another Committee is formed that advantage will be taken of his wonderful knowledge of financial matters in general, and those affecting China's Currency problem in particular. Dr. Chen Chin-tao is one of the founders of the Shing-Hua Exchange Bank which received its charter from the Advisory Council on November 22nd, 1912. This institution is to fulfil functions for China somewhat similar to those performed by the Yokohama Specie Bank for Japan. It is supported by the Government to the extent of $10,000,000, but is owned by private shareholders. It would be a regrettable thing for China if the Government fails to make it possible for Dr. Chen to give his services in the reform of the Auditing Department and China's Currency. Men of his attainments are too few and far between in China for the country to regard with equanimity his withdrawal from active participation in the gigantic work of reorganizing the financial machinery.

THE CURRENCY COMMISSION'S REPORT

Some Introductory Remarks

Most of China's difficulties are financial, in the broad as well as in the narrow sense. She has been wanting money for a very great length of time, and she has been wanting an improvement in the money she possesses for longer. Even those who take no interest in currency problems, if they live or travel in China, find themselves compelled to notice that sale or purchase or banking operations are attended by elements of unpleasing uncertainty. The fact that the currency is based on silver and that all important operations are calculated in a fictitious unit, which changes its value even in adjoining districts, has long made China the despair of the statistician and the paradise of those who thrive by "exchange." In our November issue we gave a synopsis of Dr. Vissering's extremely valuable treatise on Chinese Currency Reform. Dr. Vissering, in that excellent work, propounded a scheme for currency reorganization in China that was divided into three periods. For the benefit of those who may not have studied Dr. Vissering's proposals we may recapitulate the main points. The reform was to be spread over the three periods as follow:—

First Period

1. The very first step must be the adoption of a future gold unit as a foundation of the new system, in order to avoid speculation on the announcement of the gold par, and also to avoid that the new unit would later on have to be raised to its future nominal value.
2. The organization of a central bank of issue, or otherwise the reorganisation of the Ta Ch'ing Bank as a central bank for the whole country.
3. The introduction of the new gold unit as a money of account for book credits and book transfers.
4. Securing the co-operation of the foreign exchange banks and of the private Chinese banks and bankers for the introduction of the new gold unit into their bookkeeping.
5. The issue of bank notes based upon the new gold unit.
6. The accumulation of a gold reserve against the aforesaid bank notes.
7. The regulation of the management of this gold reserve.
8. Eventually declaring the bank notes legal tender.
9. To make a close study of the conditions of the balance of trade and of the balance of payments for China.

Second Period

10. The establishment of weight, fineness and alloy of the token coins and of the new subsidiary coinage.
11. The issue of these tokens, coins and subsidiary coins, and simultaneously,
12. The accumulation of a gold reserve against the token coins and the regulation of its management.
13. If desirable: the coinage and issue of gold coins. Also, if desirable, the

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temporary admission of some particular foreign gold coins as legal tender, and the temporary issue of gold certificates.

14. The proclamation as unlimited legal tender of:

   a. the silver token coins of 1 unit and 2 units;

   b. the above mentioned gold [illegible] eventually the gold certificates.

Third Period

15. The gradual withdrawal and subsequent demonetization of the old silver dollars, as far as necessary of the old sycee and of the present copper cash.

While the Chinese have sought the advice of renowned foreign experts such as Professor Jenks and Dr. Vissering they have not forgotten the fact that they have among themselves several men who are admittedly thoroughly well informed in matters of finance and currency. To name but three Dr. Chen Chin-tao, Hsu Un-yuen and Dr. Chang Tsung-yuen are men of more than local reputation. It was very properly felt that while, necessarily, the opinions of foreign experts in view of their wider experience and more extended studies, were absolutely essential, the aid of Chinese experts was also material in view of their superior knowledge of their own people and conditions. With a view of making the greatest possible use of both foreign and Chinese expert knowledge a Committee called the Currency Commission was formed. The report of this body we give elsewhere, and from it can be judged the value of the work it has accomplished. It is of interest to note that the Commission consists of twenty legal, acting and associate members. Among the members are the Minister and Vice-Minister of Finance; Dr. Chang Tsung-yuen, the Financial Commissioner who has been sent to London; the President and Vice-President of the Bank of China; the President of the Exchange Bank, and the Director of the Division of Money and Banking in the Board of Finance. The acting members are those who have specialized in currency and the associate members are drawn from other Boards and are men who have had experience in currency matters.

The original intention was to have a special Bureau of Currency, but the Advisory Council would not pass the appropriation for its inauguration and this idea, unfortunately, was abandoned. In view of this it was decided to establish a Currency Division under the Board of Finance with the title of "The Division of Currency and Banking." The Currency Commission was then formed to consider the subject and to report to the Government.

The Commission held several meetings in October and November last year and it was aided by Dr. Vissering and the late Dr. Roest, whose tragic death at Mukden while on his way from Europe to Peking to take up his post as Currency Adviser will be remembered. The meetings were presided over by Dr. Chang Tsung-yuen. A study of the minutes shows that the members had a thorough grasp of the subject and this is demonstrated by the searching questions put to the foreign experts by Messrs. Tao, Woo, Sung, Lee and Dr. Chang among others. These questions and the conclusions finally arrived at show that the great desire was to ascertain not the theoretically best system, but the system that could achieve the best practical results for China in the shortest space of time. The members of the Commission aimed at securing the adoption of laws regulating banking in relation to currency; unifying the various provincial mints and placing them under central control, and at establishing a gold reserve. The more enthusiastic wished to see the reform carried out comprehensively in the shortest possible space of time. Others wished to see the change introduced at different places at different times and full notice given to the people so as to prepare them for what would certainly be a revolution in their ordinary methods. Some preparation in the shape of explaining to the people the true purport of the change, it was thought, would be necessary. Some questions would have to be left in abeyance until definite steps were decided upon. The rate of exchange between the old and the new money was a point upon which members of the Commission were anxious for light. When the reform is actually introduced the Government will endeavour to secure the aid of the Commercial guilds and similar bodies to assist in rendering the introduction of the new system as smooth as possible. Rewards will also be offered to those who watch the operation of the reform, note the difficulties and suggest improvements and rectifications. Cordial co-operation between the Government and the commercial and financial interests, foreign and Chinese is aimed at and will, it is thought, go far towards rendering easy the application of a reform that will eventually be of incalculable service to the country. It is proposed to establish a school to educate students in currency matters and to send those who show promise abroad further to study the question.

A fact that must be kept in view when considering currency in China is that the only real currency of the country is copper. The daily purchases of 99 per cent. of the people are made in copper, or upon a copper basis, to speak with absolute accuracy. The indefinite tael is a fiction like the guinea in England; it is pretty generally known that in England no one, unless he be a purchaser of race-horses, works of art or similar luxuries, ever dreams of calculating in guineas. The bulk of the people of China do not concern themselves about taels. The dollar is largely a treaty port freak. It has never entered into the national life of the people, being too large as a unit for every-day use. It seems obvious, therefore, that whatever coin is ultimately fixed upon as a unit should be of a relatively small value, a point that Dr. Vissering has very properly strongly insisted upon.

WANG CHING-FANG, VICE-PRESIDENT OF THE CURRENCY COMMISSION; DIRECTOR OF THE BUREAU OF AUDIT, DIRECTOR OF THE BUREAU FOR REORGANIZING THE NATIONAL TAX OFFICES

The question of counterfeiting was one to which the Commission wisely devoted considerable attention. This is a question of the first importance and it will be seen that the Commission has dealt with the matter fully in its report. The point that stands out most strongly after perusing the minutes of the Currency Commission and the Report is that the members fully recognised the paramount importance of the subject with which they were grappling. The chaotic condition of China's currency has kept her back more than the unthinking suppose, and a universal system throughout the Republic will result in a quickening of the commercial and financial life of the country that will be a revelation to those who fail to realize that without a stable currency the economic wheels cannot revolve without friction. The thoughtful and valuable suggestions presented by the Commission, though they will not find acceptance in their entirety from all, are most encouraging in that they show that the brains of China are concentrating themselves upon a problem the solution of which would be of infinitely more valuable than the essays in statecraft upon which China is sometimes urged to adventure.

FINAL REPORT ON THE MEETINGS OF THE CURRENCY COMMITTEE

[SPECIALLY TRANSLATED FROM THE CHINESE FOR THE FAR EASTERN REVIEW]

This Committee was established on the 8th day of the 10th month of the first Year of the Chinese Republic, and up to the 17th day of the 12th month, 38 meetings took place. With the exception of the meetings for the discussion of the Regulations of the Banks, 23 of the above number of meetings were occupied in the discussion of the currency question. All the discussions may be grouped under the two following headings:—

1, the question of standard, and 2, the essentials of the Gold Exchange Standard.

THE QUESTION OF STANDARD

The standards of currency may be divided into five kinds. 1, Gold Standard; 2, Gold Exchange Standard; 3, Gold and Silver Standard; 4, Silver Standard, and 5, Paper-Money Standard. As the Gold and Silver Standard has been proved a failure, and the Paper-Money Standard is exceedingly dangerous, there is no need of discussing them. Therefore this Committee has paid more attention to the following standards:—Gold, Gold Exchange and Silver; and they will be fully treated in the following.

THE ADVANTAGES AND DISADVANTAGES OF THE SILVER STANDARD

1. *The advantage of the Silver Standard.*—There is only one advantage for the adoption of the Silver Standard, *i.e.*, it affords facility in circulation. In the Gold Standard system, the Gold Unit is to be represented by token coins or exchange notes: and as exchange notes possess no real value, the real value of token coins being far below their face value, they could only be circulated if the Government gains the credit of the people. In the Silver Standard there is no such disadvantage, because the value of the legal tender of silver is equal to its real value; hence, it is welcomed by the people. Moreover, the Chinese are accustomed to the use of silver, thus giving facility to its circulation. This is, therefore, the sole advantage of the Silver Standard.

The reasons which lead Chinese to think of adopting the Silver Standard are as follow:

Every year in China the imported goods far exceed those exported, and should a Gold Standard be adopted the imported goods would increase more and the exported decrease; hence it is desirable that a Silver Standard should be adopted as a remedy. Even foreigners believe in such a fallacy. We will point out this fallacy by the following explanations:

Those who advocate a Silver Standard argue as follows:

There is a rise and fall of the market price of the silver bullion, the fluctuation of which will never be seriously felt, if not reckoned with gold. In a country where a Silver Standard is adopted, the fall of the market

price cannot be readily felt by the common people; hence no increase of wages is demanded; if there be no such demand, it means that there will be no rise in the price of the products of industry. Thus, when the market price of silver is low nothing would

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affect the price of export goods. If reckoned by gold the difference would be felt. Therefore in such a time if goods be sold to a country whose standard is gold, when the price be realized in silver there would be a profit. In such an instance even if the other party insists upon a reduction of price for the goods sold, there would still be profit. This then is an influence which tends to the increase of exported goods.

But such an erroneous theory can be refuted by the following facts: Silver Standard could by no means increase exported goods. When the Siver Standard was adopted in India, it was noticed that the increase of exported goods was very slight in the time when the market price for silver was very low, in comparison with the time when the price was normal. In China from the year 1891 to 1901 the increase of exported goods, was 21%, thus the average yearly increase was 2%. The increase was far below that of those countries whose standard is gold, such as Japan, Philippines, Hongkong, etc. In Mexico, from 1892 to 1902, the increase of exported goods was 18, 38/100%, thus making an average yearly increase of less than 2%. The products of Mexico have lately been greatly increased, but her increase of exported goods was slight. Judging from the exported goods of the above three countries, it is undeniable that the fall of the market price in silver will by no means encourage the export trade.

Furthermore, should it be possible to encourage export trade by a fall of the market price in silver, it is still impossible for the country, which has adopted the Silver Standard, to derive any profit, because when reckoned by silver there is apparently an increase, but when reckoned by gold really there is a decrease. In 1902 the total of exported goods of Mexico was $20,000,000, and if there was no fall in the price of silver the goods would have reached a value of $33,000,000. Take the instance of the international trade of China; when a comparison in the price of exported goods is made between the year 1903 and 1899, there was a loss of $35,000,000 due to fluctuation of price of silver and an increase of $20,000,000 in the price of imported goods by foreign countries which have adopted the Gold Standard. Thus the total loss to China was no less than $55,000,000. In a word, we have given out more goods in exchange for less commodities. Thus the country which has adopted the Silver Standard will always sustain a tremendous loss in her international dealings.

Therefore it is plain that will be no increase, and should there be an increase, it would not profit the trade. The only advantage of Silver Standard is confined to the facility of circulation.

II. THE DISADVANTAGES OF THE ADOPTION OF THE SILVER STANDARD

There are four disadvantages, as follows:—

1. *In international exchange.* In dealing with Gold Standard countries the exchange could not be fixed owing to the fluctuation of the price of silver. When the price of silver is low, great loss would be involved in the redemption of foreign loans, and in the transmission of funds by the people.

2. *In international trade.* As the exchange differs so much, in the international trade margins have to be made twice, *i.e.*, between the time when goods are bought and the time they are sold, and between the time when the goods are advanced and the time when the payments would be made; allowance must be made to provide against any loss. The trade between two Gold Standard countries is easier to develope, because they have only to make one allowance against any fluctuation of price.

3. *In the exchange of commodities, the Silver Standard country has to give a greater quantity of goods.* The reason is that when the price of silver is low the price of exported goods of the Silver Standard country will be cheaper, and when the price of gold is higher the price of the exported goods of the Gold Standard country will be dearer. Thus the trade between these two countries would naturally result in the disadvantage and loss to the party that has adopted the silver standard. (When reckoned with silver it is true that there seems no loss, but when reckoned with gold the loss would be seen readily). Again, if the traders of the Silver Standard country should use the proceeds of their goods sold in the Gold Standard country to purchase her goods, it is obvious that in the exchange of commodities there is tremendous loss to them.

4. *In the securing of foreign capital.* The fluctuation of the prices of Silver and Gold is so precarious, that the investment of capital in a Silver Standard country is subject to constant vicissitude, and it would sometimes be that the interest gain would not be able to cover the loss by exchange, when the price of silver falls. Therefore, nearly all the loans contracted by China are reckoned by the gold standard or none would take the risk of fluctuation by investing capital in a Silver Standard country.

There is only one advantage against four disadvantages and it is plain that the Silver Standard should not be adopted. But there is another suggestion that as the present system of currency is so corrupt, it is desirable that *uniformity of the silver currency should first be effected*, and then, copying the example of India, by stopping the free minting of the silver coins and raising the price of silver, to fix a ratio between silver and gold, thus bringing about the Gold Exchange Standard. Thus the Silver Standard is only temporarily to be adopted in this period of transition.

The above theory is impracticable, as it is full of inconvenience. There was a special reason for the measures of the said currency reform of India. Before the reform India had a superfluity of rupees in the market, and if China is going to copy her example she has first to mint a tremendous amount of silver coins. Moreover, after minting the silver coin, fixing the ratio between silver and gold, and raising the value of the legal tender, the merchants and people would no doubt accumulate such silver coins for speculation, as it was done in India. Would it not be better at once to adopt the Gold Exchange Standard, in order to avoid having twice to disturb the financial condition of the country? Hence the Silver Standard should not be used as a transitory measure.

Some suggested that the Gold Standard should be adopted. But it does not suit the present circumstances. It would be necessary to mint gold coins, (1) Considering the present financial difficulties, it is inadvisable to spend a big sum of money to mint the gold coins, (2) To provide the whole country with sufficient gold coins, there must be enough gold bullion and coins in the Treasury, thus much interest would be lost. Should this big amount of gold be reserved in the Treasury as a gold reserve for a similar Government paper money, as the new standard has not yet been enforced, these papers would hardly represent the new gold unit. (3) The standard of currency is closely connected with the standard of living of the people of the country. If the standard of living be low, the Gold Standard cannot be adopted. Should such standard be forced upon the people it is feared that they would either convert the coins to other uses or sell them to foreign countries. In view of the above three difficulties, there is no need to consider the Gold Standard.

THE ADVANTAGES AND DISADVANTAGES OF A GOLD EXCHANGE STANDARD

I. There are eight advantages of a Gold Exchange Standard

1. *Stability in international Exchange.*—Should we adopt the Gold Exchange Standard, in the exchange business the rate cannot be higher or lower than the rate of gold for the international trade; and there is no fear of loss of exchange in the repayment of foreign loans.

2. *The development of our international trade.*—The trade will not be affected by the vicissitudes of the price of silver, and there would be no need of making great margins for fear of loss. Thus our trade can be expected to develope.

FAR T. SUNG, MEMBER OF THE CURRENCY REFORM COMMISSION

3. *No fear of giving greater quantity of goods in the exchange of commodities.*—In the international commercial dealings we will be on the same footing as they, as both parties will use

gold as the standard. There will be no fear of incurring the disadvantage of the Silver Standard.

4. *Liable to obtain foreign capital.*—In view of the vast resources of China, it would naturally attract the attention of foreign capitalists; but owing to the absence of a currency standard, they do not want to take the risk of loss by exchange. Should a Gold Exchange Standard be adopted, the foreign capitalists not only would lend their money for interest, but would invest it in industrial enterprises, etc. When the Gold Standard was introduced in Russia big sums of money flooded in.

5. *Gold Standard may be conveniently introduced at any time to replace the Gold Exchange Standard.*—When the standard of the living of the people is higher the minting of silver coins may be abandoned, and gold coins according to the fixed standard may be minted, and circulated. This was done in Mexico.

The above five advantages are directly opposite to the disadvantages of the Silver Standard.

6. *In the country there is facility for still using the silver coinage.*—In a country where the standard of living is low it is inevitable that silver should be used in the interior because the gold coin is too big to pay a small sum. By adopting the Gold Exchange Standard, though all reckoning should be done in gold, the payments and receipts will be transacted by silver.

7. *The price of silver will not fall suddenly.*—If the Gold Standard be adopted, the silver, which has hitherto served as the medium of exchange, besides serving as subsidiary coin, would lose much of its utility. The supply would far exceed the demand, hence the price would fall considerably. If a Gold Exchange Standard be adopted, silver would be used in coining the token coins, and there will be no financial crisis.

8. *There is no need to keep a big amount of gold and thus a loss of interest would be avoided.*—Unlike the adoption of Gold Standard, the Gold Exchange Standard does not necessitate reserving a large amount of gold bullion or gold coins, losing the interest thereof.

The last three advantages are directly in opposition to the disadvantages of adopting a Gold Standard.

II. *There are two difficulties in connection with Gold Exchange Standard.*

1. *To maintain the adapted prices between the silver and the gold.*—In intercourse with foreign countries everything would be reckoned by gold, and in the country silver is used. To maintain the legal price of the silver coins, there must be well regulated organs, and good management. Should the Government for the sake of gain issue too many silver coins the prices between silver and gold will not be maintained. Then the Gold Exchange Standard would be a failure.

2. *It is difficult to introduce it in the beginning.*—As there are no gold coins to be circulated in the country, it is difficult to make the people understand that the token coins and exchange notes would represent the gold unit, because the value of the legal tender of these silver token coins is below their real value. It is the custom of our people to take the coins at their intrinsic value, and if they notice that the face value of these new coins is far above their real value, they would refuse to accept them. However, it must take time in order to obtain the credit of the public.

In this standard there are seven advantages against two difficulties, therefore it is preferable to the other two standards.

Chapter II. The Essentials of Gold Exchange Standard

There are three essential points with regard to the Gold Exchange Standard.

1. The representative of the gold unit; 2. The Gold reserve; and 3, the Comparison of Silver and Gold.

1. *The representative of the gold unit.* As there will be no gold coins circulating in the country and all accounts are to be reckoned by a gold unit fixed by law, there must be a medium of exchange to represent this unit. There are two kinds of medium, as follows:

(*a*) From the beginning there should be a kind of silver token coin to represent this Gold unit. The legal value of the silver token coin, used in the Gold Exchange country, is far below its real value, and is used to represent the fictitious gold unit fixed by law. This was done from the beginning of the currency reform of both of the Philippine Islands and Mexico.

(*b*) From the beginning to use the exchange notes of the Central Bank to represent this gold unit. The exchange notes of the Bank shall be first used to represent this fictitious gold unit fixed by law, and then as required by circumstances issue silver token coins. This theory has been advocated by Dr. Vissering.

Let a comparison be drawn between the above two suggestions, to ascertain their advantages and disadvantages.

The advantages of (*a*) are as follows:—

(1). It is easier to circulate the silver token coins than the exchange notes. Though the former has a lower real than face value, yet it is better than the latter, which has no real value at all, and naturally the former would be better received by the public.

(2) In time of great crisis the silver token coins would be far preferable to exchange notes, which have no real value at all.

(3) The rate of exchange between the silver token coins and the exchange notes would be fixed. According to (*b*) the Government exchange notes can only be exchanged for the old silver coins, and, as the rate of the latter is subject to changes, the exchange rate can never be fixed. If the silver token coins be introduced at once, the exchange notes of the Central Bank can both represent the gold unit and the silver token coins. Although the gold unit be a fictitious one, the silver token coin is a real one. Thus the rate between the silver token coins and the exchange notes would be fixed.

(4) There will be an uniform currency from the very beginning. If the suggestion containing in (*b*) be adopted there will not be such an advantage, as old coins would continue to circulate.

(5) Old coins can be recalled from the market. By issuing silver token coins, the old coins may be replaced immediately.

The disadvantages of (2) are as follows:—

(1) While the new coins are smaller than the old, their legal value is higher. It is feared that by comparing the two, it will be hard to persuade the public to accept the same. Hence it seems better to use the exchange notes from which no comparison could be drawn.

(2) It is difficult to adopt by law the relative price of silver and gold. If such price be too low, when the price of silver bullion be high the new coins will be exported or destroyed for other purposes, as was done in the Philippine Islands, and if too high, great profits would be derived by forgery. It would be impossible to guard against forgery by foreign bad characters and foreigners hiding themselves in foreign settlements.

But the above disadvantages are unavoidable if the suggestion of (*b*) be followed.

The advantages of (*b*) are as follows:—

(1) It is easier to guard against forgery. It is a far more difficult thing to forge a note than a coin. This is the only reason, Dr. Vissering favours the suggestion of (*b*)

(2) It is easier to obtain gold reserve. Although there is profit in minting silver token coins, it requires big capital. It is not so with the issue of exchange notes which have no real value, and the proceeds of these notes can be used as gold reserve.

(3) There will be no comparison between the old and the new coins (vide the 1st disadvantage of (2).

(4) It is more convenient to use paper money than coin, as universally recognized by finance experts.

The disadvantages of (*b*) are as follows:—

(1) It is inconvenient in exchange. As the gold price of the old silver coins fluctuates the rate of exchange could not be fixed. The people would be led to think that the price of the exchange notes is irregular, hence, they may refuse to accept them.

(2) Owing to the above reason, it would be difficult to circulate.

(3) The old silver coins will be hard to recall from the market, because such notes would be hard to circulate.

(4) It would be difficult to cash these notes during a time of crisis, and as the reserve would be in foreign countries, it is feared that the Central Bank would fail to meet its obligations.

Comparing these two suggestions, it seems that (*a*) is more advisable. The only advantage of (*b*) is that it is less liable to forgery; but still forgery is unavoidable. But the disadvantage of (2) may be avoided if more adequate means be used to guard against forgery. More refined designs be made on the coin; the co-operation of the foreign authorities could be secured to guard against forgers in the foreign settlements; and stricter investigations be made by the Customs; and we do not see why these disadvantage cannot be avoided. As to other advantages and disadvantages when a comparison is made it is advisable to adopt the suggestions contained in (*a*).

II. *The Gold Reserve.* The reserve may be divided into two kinds; (1) The Exchange reserve, *i.e.*, the exchange is to represent the token coin of the Gold unit, or the gold amount of the exchange notes: and (2) The reserve for the repayment of foreign loans.

(1) The method of the exchange reserve. Raise an amount of gold equal to the amount of token coins, which represent the gold unit, or the amount of the exchange notes, issued by the Government. This amount will be kept in foreign markets. When these token coins and exchange notes are used in buying foreign gold orders, the token coins and exchange notes may be cashed from this reserve. If after these coins and notes have been bought back, the Government or people still want to pay foreign loans, they may be paid by silver.

(2) The Gold Reserve for the repayment of foreign loans. Raise a big amount of gold, and buying foreign gold orders with the token coins and the exchange notes. Besides cashing the coins and notes the amount may be used in the repayment of foreign loans and the settlement of international accounts.

The following are the advantages and disadvantages of (1) and (2). The advantages of (1) are as follows:—

(*a*) The profit of minting the silver token coins, or the proceeds of the exchange notes may be used as the Gold reserve; and there is no necessity for a loan.

(*b*) To use silver to repay foreign loans or to settle international accounts, there is no fear of a greater supply than demand, and the financial situation will not be affected by a sudden fall in the price of silver.

The disadvantages of (1) are as follows:—

(*a*) If in the beginning of the currency reform, great sums of money be required to settle the international accounts, and the sums have to be remitted to the foreign countries. It is natural that the people will use up all the token money and exchange notes to purchase the international money orders, and, as then externally there will be no reserve abroad and internally then will be no representative of the gold unit, in circulation, the gold exchange standard will be reduced to merely a gold unit by name. When the new coins are widely circulated as medium of exchange, the old coins will be recalled from the market and then there would be no fear of the above failure. The trouble is when in the beginning the people would use all the token coins and exchange notes to buy gold orders, leaving the

old coins to be the medium of exchange in the country.

(*b*) If silver be used to pay international accounts, the foreign bankers may lower the price of silver when the payment is due; thus we will suffer loss as we have done now.

(*c*) If silver be used to repay the foreign loans, the Government will be unable to fix the budget on the item of the redemption of foreign loans, because the price of silver varies.

The advantages of (2) are as follows:—

(*a*) As we have a large gold reserve, when redeeming foreign loans as settling international accounts both silver and gold may be used, and there will be no anxiety that they would lower the rate of silver to cause us a loss in exchange.

(*b*) If gold be used to redeem the foreign loan, it would be easy for the Government to draw up the Budget, in regard to the repayment of the loan in the year.

(*a*) Having a large gold reserve, in the beginning of the currency reform more token coins or exchange notes may be issued to replace at once the old coins. Stop the circulation of Sycee (bullion) at once. Not only will not the foreign reserve be used up, but the new coins will be still circulating in the country.

The following are the disadvantages of (2):—

(*a*) To raise a large gold reserve, the Government would have to contract foreign loans.

(*b*) In the redemption of foreign loans and the settlement of international accounts, if less silver be used it is probable that the supply of silver in the country will far surpass the demand, thus resulting in a financial crisis from the fall of the price of silver.

A comparison of the above will show that (2) is more preferable.

III. The comparison between silver and gold, *i.e.*, the equivalent of the fine gold which is supposed to be contained in the Gold unit to the bullion par of the silver token coin which represents the Gold unit. It is not exactly the equivalent between the gold bullion and the silver bullion. When fixing the comparison, it is necessary that the face value of the silver token coin should be much higher than its intrinsic value. There are no fixed rules laying down how much higher it should be.

(1) In the following instances the face value of the silver token coins has been exceedingly high.

In Japan the yen is at a gold ratio of 21.6 to 1; in India the rupee is 21.9 to 1; in the Philippines and Straits the dollar is 21.3 to 1.

(2) To make the face value a little higher than its intrinsic value. In former times the gold ratio in Japan was 29.1 to 1, in the Philippines 32.24 to 1 and in Mexico 32.58 to 1.

Let us consider the advantages and disadvantages of the above (1) and (2).

The following are the advantages of (1).

(*a*) The coin will not be melted, because, however high the market price of silver may be, it will not be higher than the face value of the token coins.

(*b*) A considerable gold reserve may be derived from the seigniorage profit from coinage.

The disadvantages of (1).

(*a*) The difference between the face value and the intrinsic value is so big, that special means must be provided to guard against forgery from which great profit could be derived.

(*b*) It is feared that in the preliminary stage the public would refuse to accept it.

The advantages of (2)

(*a*) As the face value is not much below the intrinsic value, it is easier to guard against forgery.

(*b*) More acceptable to the public in the preliminary stage.

The disadvantages of (2)

(*a*) When the price of the silver bullion is high, and the silver contained in the coin is above its face value, the coin will be melted. The Government would have to fix the ratio again and to mint over again the token coins. At one time Philippine Government fixed the gold ratio at 32.24 to 1 and the result was that when the price of silver was high the coins were melted or exported.

A comparison of (1) and (2) will show that although the disadvantage of (2) is great, the disadvantage (*a*) of (1) must be seriously considered. First we must consider the inefficiency of our police system; and secondly, as there are many foreign settlements in the country, it is difficult to keep out the foreign forgeries from them. It seems more advantageous to adopt the suggestions of (2); but to avoid forgery it is advisable that the face value should not be too high above the intrinsic value, nor too near, so that the failure of the Philippines may not be repeated in our country.

The Committee therefore decided that in the currency reform of this country the Gold Exchange Standard should be adopted, as regards the essential points of the Gold Exchange Standard: that the gold unit should be represented by silver token coins, which seems to be better than the exchange notes: that the gold reserve should be sufficient to meet the demands of exchange, the repayment of foreign loans and the settlement of the international trade balance; and that the fixed ratio should be settled to guard against forgery and melting, and it should neither be too high nor too low.

The above is a summary of the results arrived at the meetings.

THE CENTRAL BANK

The articles of the proposed Bank of China, which, as indicated in the report, is to perform functions somewhat similar to those of the Bank of England and other semi-state institutions, have been prepared and submitted to the Advisory Council. They have not yet been adopted. Below we give a translation of the artlcies:—

ARTICLES

1. The Bank of China shall be a limited Company in shares.

2. The capital of the Bank of China shall be $60,000,000, divided into 600,000 shares, each share $100. The Government shall first buy 300,000 and the rest are to be sold to the people. If the people should demand more the Government will sell the shares it holds to them from period to period.

Should it be necessary that the capital should be increased, it shall be done by the decision of the shareholders' meeting, and the approval of the Minister of Finance.

After the introduction of the new monetary system, the amount of dollars in the share shall be re-adjusted accordingly, and the difference shall be settled with the shareholders.

3. One third of the amount of the shares bought by the Government shall first be paid to the Bank of China to start the enterprise, and the same shares should be sold. The regulations for the sale of shares shall be fixed separately.

4. The Bank of China shall fix its Head Office at the seat of Central Government; shall establish branch offices or sub offices in the capitals of the provinces, and other commercial centres according to circumstances; and shall make agreements with other banks regarding agency or exchange. But all the above have to be approved by the Minister of Finance.

Should the Government deem it necessary, it may consult or instruct the Head Office to open a branch or sub office, or agency at an indicated place.

5. The names of the shareholders shall be prescribed in the shares, and none besides the citizens of the Republic can hold them by right of purchase or transfer.

6. The period of the Company shall be 30 years, commencing from the date when the Head Office is opened, and after expiration the period may be extended by the decision of the shareholders' meeting and the approval of the Minister of Finance.

7. Out of the total amount of the yearly profit above one tenth shall be laid aside to build a public fund, and the rest will be paid to the shareholders as profit of their shares.

The accumulation of above fund and the payment of profits shall be decided by the Shareholders' meeting and approved by the Minister of Finance.

8. The fund referred to above shall be used as follows:—

(*a*) To make up the loss in the capital.

(*b*) To maintain the equality of the profits.

9. The business of the Bank of China is as follows:—

(*a*) To manage the certificates of the Government treasury, commercial letters of credit and the issuing or cashing of exchange notes.

(*b*) To manage the exchange business and to issue notes.

(*c*) To deal in silver and gold bullion and moneys of other countries.

(*d*) To receive various kinds of deposits, and the safe-keeping of various documents and other valuables.

(*e*) To collect the amounts of various notes, etc., for other banks, companies, shops, individuals or those who have intercourse with the Bank of China.

(*f*) To loan funds by the security of gold and silver wares, or gold and silver bullion.

(*g*) To loan funds, which are either paid at once or by instalment, to the public on the security of the certificates of government bonds, or other various kinds of valuable documents or certificates issued by the Government. The amount and interest should be decided according to the conditions by the Director, Vice-Director, Committee or Superintendent, and to be approved by the Minister of Finance.

The limit of the above items shall be fixed separately.

10. The Bank of China may deal in bonds on public loan, but with the approval of the Minister of Finance.

11. Besides the business specified in the two previous articles the Bank of China should not deal in the following and other business.

(*a*) To take immovable properties or the shares of the various banks or companies as security.

(*b*) To buy from the public the shares of the Bank of China, or to take them as security for loan.

(*c*) To buy or to accept immovable properties, besides what is necessary for the use of the Bank.

(*d*) To take part directly or indirectly, in any industrial or commercial enterprises.

12. The Bank of China shall have the right to issue and circulate exchange notes, but it should observe the regulations regarding exchange notes.

The regulations of the exchange notes shall be fixed by law.

Before the promulgation of the above regulations, the provisional regulations fixed by the Ministry of Finance shall apply.

13. The Bank of China shall be entrusted by the Government to manage the affairs of the Government treasury and to raise or to redeem public loans.

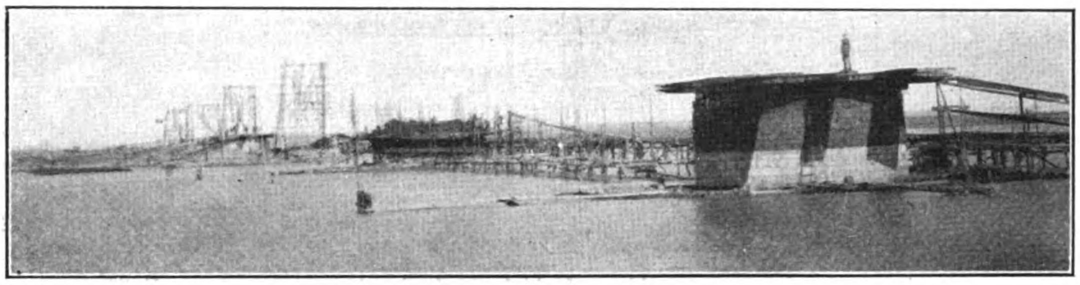
14. The Bank of China shall be responsible for the circulation of the monetary system of the Government.

(*Continued on page 409*)

THE RAILWAYS OF TAIWAN (FORMOSA)

A LINE THROUGH THE CLOUDS

In a recent lecture upon Taiwan (Formosa) Mr. Uchida, the Civil Governor, gave a brief history of the work performed by the Japanese in the possession since the cession by China. The record was an extremely gratifying one, and the island evidently has progressed more in the eighteen years that have elapsed since the Japanese occupation, then it did in all the preceding centuries. It is interesting to note that the population of Taiwan is about 3,400,000, of whom 100,000 are Japanese, while 120,000 are aborigines. The remainder are Chinese, mostly from Canton and Fukien. The production of sugar is one of the main industries of the island and the amount turned out is some 500,000,000 annually. Very successful experiments in growing hemp and cotton and in sericulture have been made.



TAIWAN RAILWAY.—THE ARKO LINE UNDER CONSTRUCTION

The harbour accommodation at Keelung and Takaw has been greatly improved. A comprehensive scheme of railway construction has been adopted and it is intended in this article to give a brief description of the work that has been done in this connection. It may be mentioned that the total mileage open to traffic up to August, 1912, amounted to 303.60 miles. These were made up as follows:—

The Main Trunk Line . . 247.30
The Tamsui Line 13.20
The Hozan Line 10.90
The Daito Line 22.40
The Arisan Line 8.80

In regard to the latter line, it was to have been opened for the entire length of 41 miles last month.

The 62 miles of rail between Keelung and Shinchiku had been constructed prior to the Japanese occupation, but after the cession, the Japanese Authorities practically relaid the track. The line was in the first instance put under the charge of the temporary Taiwan Military Railway Corps and later passed into the hands of the Civil Administration Department. In 1899, the temporary Taiwan Railway Construction Department was established, and this afterwards developed into the Railway Department of the Government of Taiwan. The Department has practically reconstructed all the old lines and has undertaken the entire management of the lines which had been more recently built.

In August 1899 it was decided to start the work of improving the main line already constructed and to construct a new line between Shinchiku and Takaw. This work was to be spread over 10 years and the sum of Yen 28,800,000 was appropriated for the purpose. Operations were begun at both the South and the North end. In view of the character of the country and the unsettled conditions, the Department is certainly to be congratulated upon finishing the whole line, and also the Tamsui and Hozan lines, by April 1908. The fact of railway communication being possible from the extreme North practically to the South of the Island has done a great deal, not only for the development of commerce, but also in the direction of pacifying the people.

The Daito line was projected for the purpose of developing the eastern side of Taiwan and is to connect Karenko and Bokusekikaku, a distance of 53 miles. The work was started in 1909 and was to be spread over 6 years. The amount appropriated for this construction was Yen 4,257,000. That portion of the line connecting Karenko and Hozan has been completed and opened to traffic, while the remainder is still under construction.

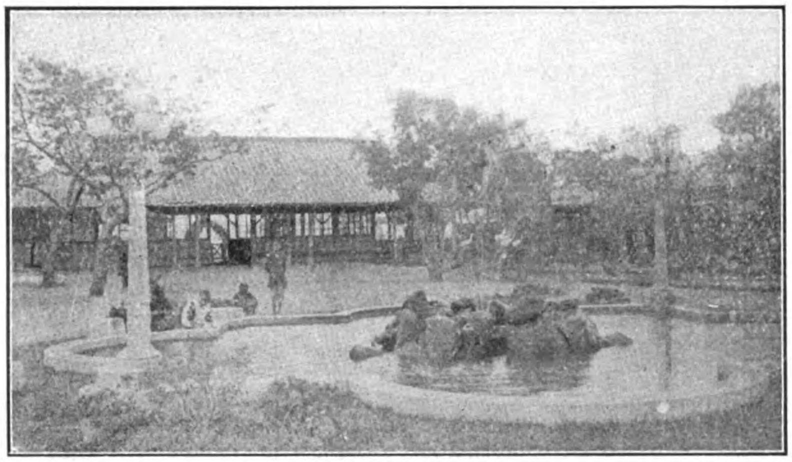
TAIWAN RAILWAY.—THE MOUNT ARISAN RACK LINE

THE ARISAN LINE

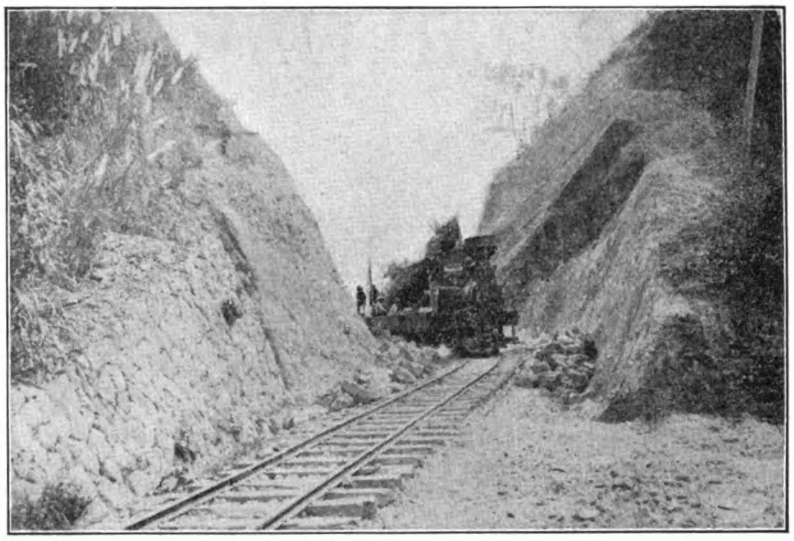
The Arisan railway is one of most interesting lines in Formosa, and it might almost be said in the Far East. The line was undertaken by the Arisan Works Department of the Taiwan Government, and a well-informed critic observes that this mountain railway will elicit favourable remark from the engineering fraternity in many countries. The construction involved steep gradients, sharp curves, a picturesque spiral, and many tunnels and bridges. The entire railway, as already stated, will cover 41 miles, from Kagi to Mount Ari station (Nimandaira) —the latter point being 7,000 feet above sea level. From Kagi to Chikutoki, 9 miles, the grade is 1 in 50. From Chikutoki, Nimandaira is reached after a 32-miles zigzag climb up the mountains to 7,000 feet, the gradient being 1 in 20, or 5 per cent. Nearly the entire line (80 per cent.) is sinuous, the sharpest curve being 35 degrees To reach Nimandaira the railway must circle a peak spiral fashion. The spiral construction begins at 1,824 feet and ends at an elevation of 2,500 feet. Between Kagi and Mount Ari there are 70 bridges, 73 tunnels, and almost innumerable cuts. The Rinnai or forest railway is 18 miles long, is tortuous, and has a gradient of 1 in 16. This railroad is called the Mount Arisan line, Mount Ari lending its name to the railway as well as to the giant forests that are the objective point of the undertaking.

IMPORTANCE OF THE LINE

The exploitation of the valuable forest of Mount Ari is no new enterprise. Years ago a private company surveyed a line and commenced constructing a road. But the undertaking was abandoned after futile attempts to interest private capital. Then the Government was approached to take over



TAIWAN RAILWAYS.—STATION GARDEN AT HOKUTO



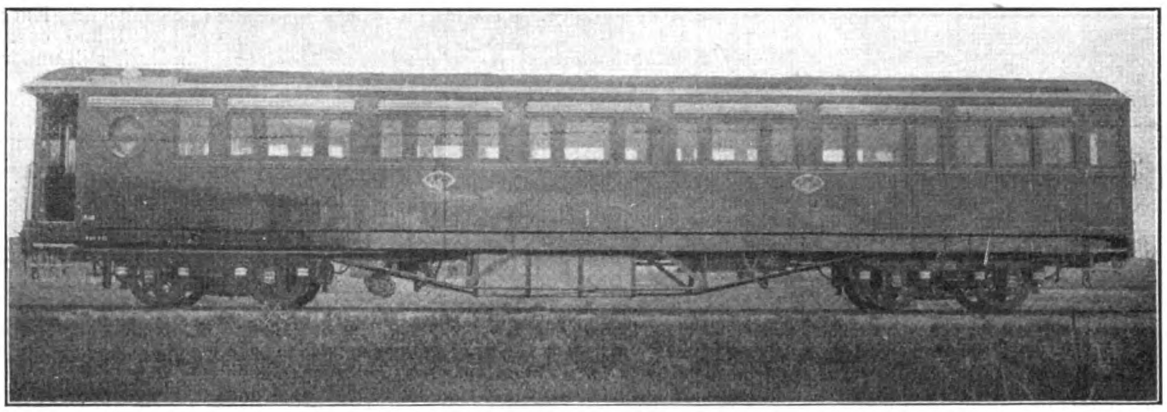
TAIWAN RAILWAYS.—CUTTING ON THE ARISAN RAILWAY

the property of the private concern and carry forward the work. After considerable discussion in the Imperial Diet an appropriation of $2,450,000 was made in 1910 for the Mount Ari forest exploitation. Practically the operation and property of the private company were of no value, and the work was started anew. The most capable engineers of the Government are directing the construction, and difficult obstacles are being rapidly overcome.

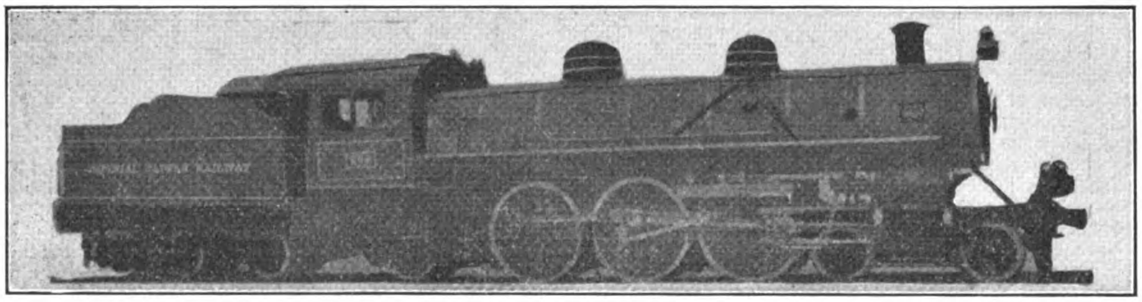
Aside from the extension of the frontier lines, no undertaking by the Formosan Government is more important to the island's development than the Mount Ari enterprise. Not only is it an important undertaking, but it is a picturesque one. The traveller reaches Mount Ari station now by sedan chair with the clouds way below him; above him is scarcely any demarcation between earth and sky. When this altitude is gained he looks upon a magnificent primeval forest, some trees of which are 2,000 years old, 135 ft. high, 65 ft. in circumference at the base, 25 ft. at the capital, with no branch visible until a height of 45 ft. Such trees as the *Chamaecyparis obtusa* (Hinoki), red *Chamaecyparis* (Benihi), and oak, forming the three useful species, may be taken as the chief object of the sylvan industry.

At Kagi, where this line begins, there will be erected an American sawmill—the Allis-Chalmers Co., Milwaukee, having recently been awarded a contract involving $150,000. The Lidgerwood Manufacturing Co., of New York, is furnishing a log-handling apparatus at a cost of $25,000. The entire railway was to be finished by January, 1913 when logs would be delivered from the forests of Mount Ari to the American-built sawmill at Kagi.

The appropriation for the line was Yen 3,480,000 and the construction was to be spread over 3 years, but, as already stated, completion of the line was expected early this year.



TAIWAN RAILWAYS.—FIRST CLASS DINING CAR



TAIWAN RAILWAYS.—HIGH POWER PACIFIC (BALDWIN) LOCOMOTIVE

Extensions and Improvements

The extensions and improvements that are projected are as follows:—

The extension of the main line from Kyukyokudo, the terminal point of the Hozan line, to Arko, the whole length of which is over 5 miles. The other line between Keelung and Taihoku (Taipeh) is to be improved by doubling the track. The appropriation for the former is Yen 2,300,000 which is to be spread over 3 years from 1911, and that of the latter Yen 1,026,200 which is to be spread over 3 years from 1912. Each of these works was commenced on the date arranged.

The traffic returns have made fair progress annually; for instance, the total revenue for 1911 was Yen 4,536,925 while the total expenditure for the same year was Yen 1,972,134, showing a profit of Yen 2,564,791.

The following is a table showing the revenue and the expenditure since 1908:—

YEAR	LINES	REVENUE	EXPENDITURE	PROFIT (Loss marked ×)	INCOME A DAY		EXPENDITURE A MILE		AVERAGE PROFIT (Loss marked ×)	
		Yen	Yen	Yen	Y	S	Y	S	Yen	S
1908	Main	2,715,829	1,449,226	1,266,603	27	342	14	590	12	752
1909	,,	3,301,045	1,559,444	1,741,601	33	336	15	748	17	588
1910	,,	4,053,214	1,732,767	2,320,447	40	931	17	498	23	433
	Taito	4,496	18,224	× 13,728	4	001	16	219	× 12	218
	Arisan	10,604	7,839	2,766	6	621	4	894	1	727
1911	Taito	19,983	80,048	× 60,065	3	940	15	783	× 11	842
	Arisan	24,629	22,338	2,291	7	647	6	936		711

NOTE:—By the main line is meant the line running lengthwise, Tamsui and Hozan lines.

LOCOMOTIVES AND ROLLING STOCK

The equipment is as follows:—

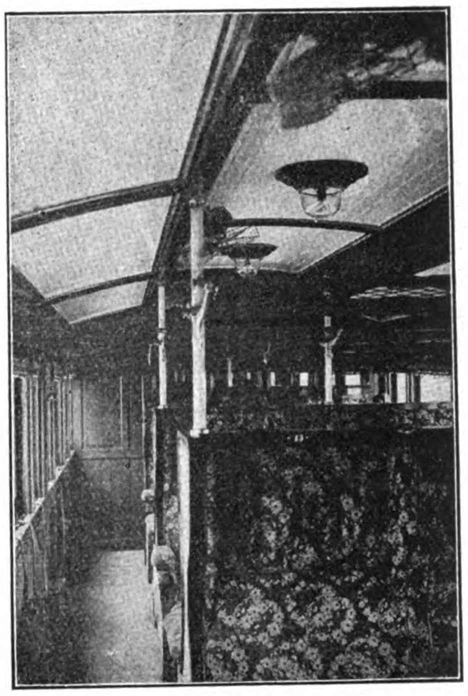
Locomotives	76
Passenger carriages	134
Wagons	1159
Total	1369

If classed by lines:—

LINES	LOCOMOTIVES	PASSENGER CARRIAGES	WAGONS	TOTAL
Main	70	127	1110	1307
Taito	4	3	35	42
Arisan	2	4	14	20
			Total..	1369

As an auxiliary means of communication, there are two light railways (hand car system) running between Horin and Pinan (86.8) and Kyukyokudo and Ako (4.4) making altogether 91.2 miles. Besides these, there are also private lines opened for public use, 168 miles, special service lines 429 miles, and private tracks (hand car system) 240 miles.

The Railway Hotel is in Daihoku, the capital of Taiwan. It is under the management of the Railway Department, and is thoroughly equipped in every way on up-to-date foreign lines. The surrounding gardens contain collections of trees and flowers indigenous to Taiwan, many of which are in full bloom throughout the year.



TAIWAN RAILWAYS.—FIRST CLASS DINING CAR

THE CENTRAL BANK

(Continued from page 406)

15. The Bank of China shall have one Director, one Vice-Director, 9 members of Committee and 5 superintendents.

16. The Director and the Vice-Director shall be "Chien Jen" (Nominated by the President), and the Members of the Committee and the Superintendents to be elected by the shareholders' society.

Shareholders, whose shares are not above 50, shall not be elected as members of the Committee of Superintendents.

The above shall not be in force before 100,000 shares have been sold to the public, and the members of the Committee and the superintendents shall be appointed by the orders of the Ministry of Finance.

17. The periods of office: The Director and the Vice-Director, 5 years; the members of Committee, 4 years; and the Superintendents 3 years. These officers may be allowed to continue after the expiration of their respective periods.

Within the period of their office, the Director and the Vice-Director shall not do other business besides the affairs of Exchange Bank and the Currency System.

Within the period of their office, the Members of the Committee and the Superintendents shall not be allowed to act as officers of other banks or companies.

18. The chief meetings of the shareholders of the Bank of China shall be two kinds as follows:—

(*a*) The ordinary shareholders' meeting.

(*b*) The provisional shareholders' meeting.

19. The ordinary shareholders' meeting shall be called by the Director once a year at the Head Office.

20. Should the Director think it necessary to discuss some important business he may call a provisional shareholders' meeting.

21. If the whole of the members of the Committee or the whole body of Superintendents, or more than 50 members of the shareholders' society with one hundredth of the amount of shares, request a meeting to discuss some important matter, a provisional meeting should be called.

22. A list of names shall be prepared 60 days prior to the meeting and the meeting can only be attended by the members who possess upwards of 10 shares.

23. In the meeting every member who possesses 10 shares shall be entitled to one vote: Above 100 shares each 50 shares shall be entitled to an additional vote.

24. When a member is unable to attend the meeting his representative shall be one of the members of the society.

The member who represents other members should not be allowed to cast for them more than 10 votes.

25. With reference to the forms used in filling reports, etc., by the Head, branch, sub offices and agencies the Bank of China shall request the Minister of Finance to fix them and to make detailed regulations of them.

26. If the Bank of China in its business should violate this law, or the regulations of the Bank, or have done anything contrary to the interest of the Government, the Minister of Finance shall interfere.

27. The Minister of Finance may appoint supervisors to supervise the affairs of the Bank.

28. The Bank of China shall according to this law draw out regulations which shall be decided by the Shareholders' society, and approved by the Minister of Finance. The same procedure shall apply in case of corrections, etc.

29. The regulations regarding the shareholders in this law shall take effect when 100,000 shares have been sold.

30. The law shall have effect from the date of promulgation.

REGULATIONS FOR COMMERCIAL BANKS

The following regulations regarding commercial banks have been presented to the Cabinet by the Ministry of Finance:—

(1) The bank notes issued by any bank shall not exceed sixty per cent. of its capital.

(2) Any banks that issue notes shall submit the bonds of Government Loans to the Ministry of Finance, and the amount of notes issued shall not exceed that of bonds submitted to the Ministry.

(3) The reserve of any bank shall be at least equal to a quarter of the notes issued and a quarter of the reserve shall be deposited in the Central Bank.

(4) The Government may put a limit to the issue of notes, beyond that limit no issue shall be allowed.

(5) In the case of bankruptcy the Government may sell the bonds submitted to the Ministry of Finance.

Regarding banks that have already issued notes, the following regulations shall apply:—

(1) Three months after the promulgation of the regulations governing the paper-notes the banks that have already issued notes shall inform the Ministry of Finance the total number of notes they issued; an amount of one-third of this number shall be paid in bonds of Government loans to the Ministry, which shall issue the same number of notes to the banks.

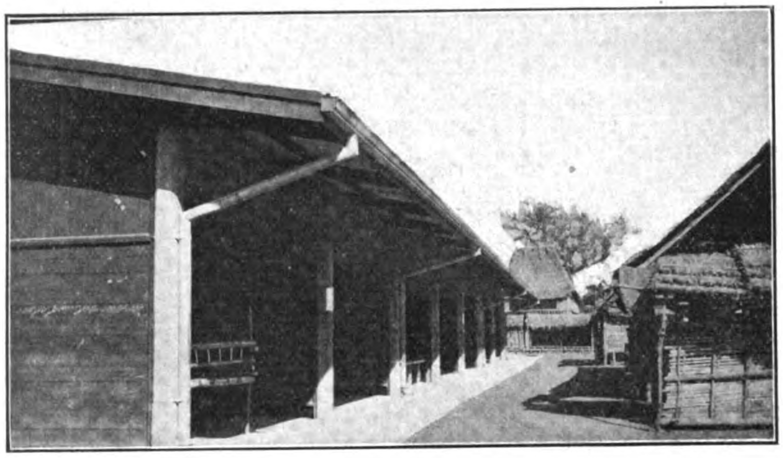
(2) Three months after the issue of this note, one-third of the old notes shall at least be exchanged back and submitted to the Ministry of Finance.

(3) Following the above system the other two-thirds of old notes shall be exchanged in one year.

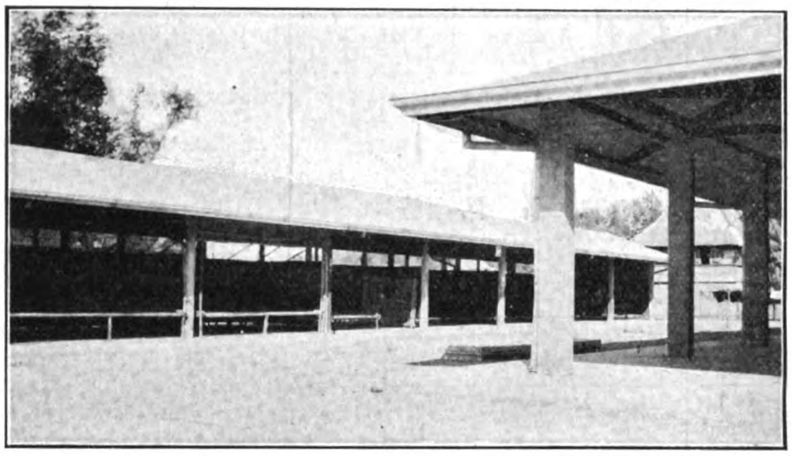
MODERNIZING PHILIPPINE MUNICIPALITIES

PROGRAM OF THE AMERICAN GOVERNMENT IN THE ISLANDS INVOLVING INVESTMENT IN PUBLIC WORKS OF MILLIONS OF IDLE FUNDS

In the accumulations of the Philippine Treasury are a number of trust and other funds amounting to about P.16,000,000. For years the greater part was deposited in banks drawing a low rate of interest and, through those avenues, gaining circulation in the development of industry and trade. As the commercial and industrial interests became more and more on a solid basis, it was recommended that this money be withdrawn from deposit and utilized for loans to the provinces and municipalities for the construction of greatly needed public improvements, the lack of which served to impede sanitation, and that could not be accomplished from current revenues. The limit on bonded indebtedness of municipalities was also an obstruction, so that it was soon realized that unless the trust funds were utilized the greatly desirable program of improvement would have to be deferred indefinitely.



OLD AND NEW MARKET AT JARO, ILOILO



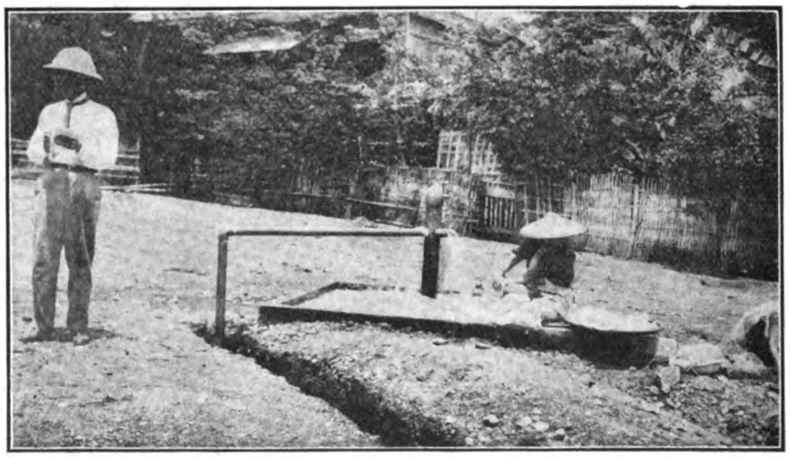
MARKET AT JARO, ILOILO

The result was that several million pesos of trust funds were made available and on June 30, 1911, P.1,345,000 had been loaned. At the end of the fiscal year, 1912, almost P.4,000,000 had been invested in public improvements in this form. At the end of 1913, including projects completed, under construction, approved, and investigated, there will be about P.10,000,000 involved. It will be noted that only necessary construction is considered such as desirable markets, water supply systems, artesian wells, sewer systems, school buildings, public bathing places, municipal buildings, etc. All construction under this heading is of reinforced concrete.

The annual report of the executive bureau for the fiscal year, ended June 30, 1912, reveals one of the most desirable and effective programs to the credit of the insular government. This refers to the loaning of trust funds to municipalities to help in the construction of permanent improvements at a low rate of interest. Reference is made to the success of the work and its bearing on the comfort, health, and moral development of the Filipino people. The results to date have been more than successful, they have fully justified the confidence reposed in the capacity of the Filipino to appreciate the benefits of good markets, good roads, pure water supply and better sanitation. And better than all, every obligation has been met and there is not a municipality affected that is not now enjoying a handsome profit from investment. Following is a review of the work now approaching gigantic proportions:

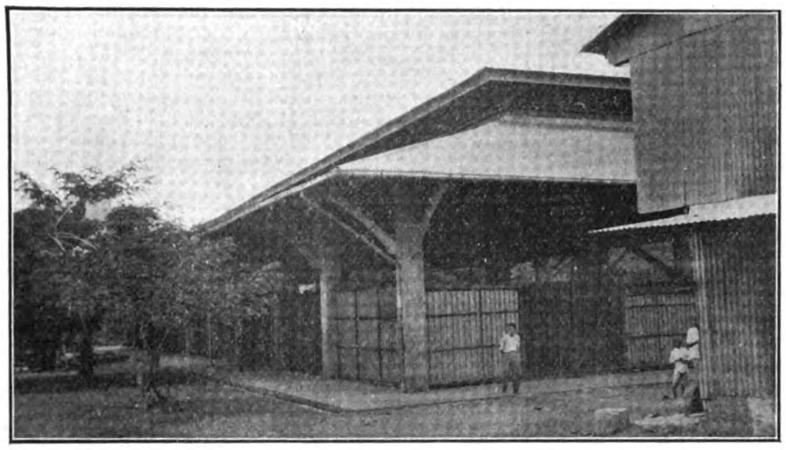
"The problem of financing the construction of municipal and provincial public works including particularly water supply systems, school houses and other necessary public buildings, sanitary markets, permanent bridges and roads, seemed in great part to have been provided for by the authority contained in the act of congress for the issue of bonds, but, in the practice it was found that rarely a project of immediate need and within the financial resources of the municipality concerned demanded a sum of money sufficient to warrant the expenditure of time of both the legislative and executive branches of the government necessary to authorize and to complete the other preliminaries incident to a bond issue, which in amount would be so small as to be of doubtful interest to investors in such securities. Accordingly in 1907 a beginning was made in financing these projects by the investment of trust funds which the insular government had on deposit with banks in the United States or in the vaults of the insular treasury, and which, by their nature, could not be required for a long period of years as in the

OLD SANTA MARIA MARKET TO BE REPLACED BY A STRUCTURE OF REINFORCED CONCRETE

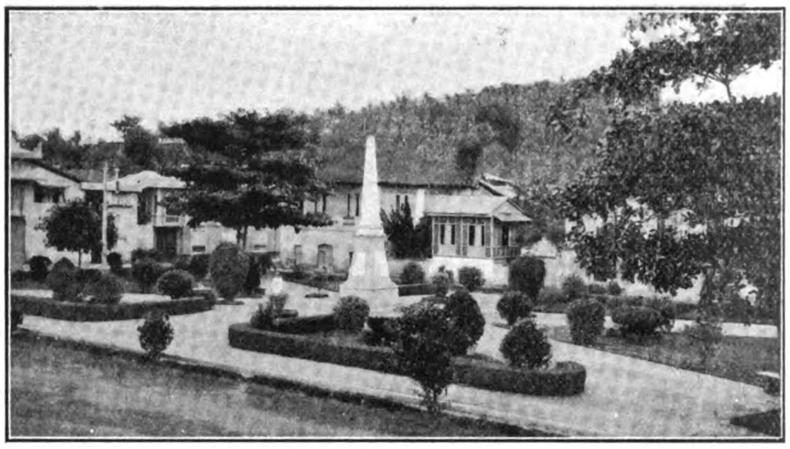


ARTESIAN WELL AT SANTA MARIA, BULACAN. FLOW 200 GAL. PER MINUTE

case of sinking funds. These investment loans to provincial and municipal governments have been made only after careful examination by this office of the projects both from the standpoint of investment and from that of the public interest to be served. The necessary and duly authenticated documentary evidence of the indebtedness and of all conditions regarding expenditure of the loan and of the payment



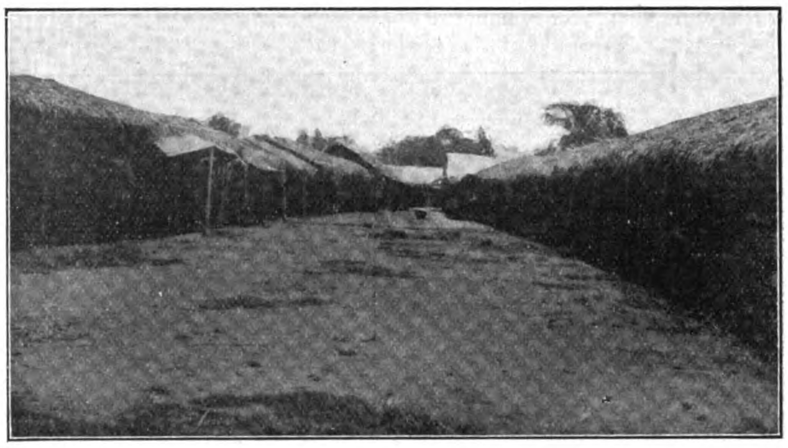
MARKET BUILDING, PAGSANJAN, LA LAGUNA



IMPROVED PLAZA, PAGSANJAN, LA LAGUNA

of interest and repayment of principal to the insular government, is executed in each instance before the funds are placed to the credit of the borrowing provincial or municipal government, and no precaution is omitted in each transaction which good business practice requires. In no instance has any default occurred in the payment of the interest (payable), or on principal account (annual payment).

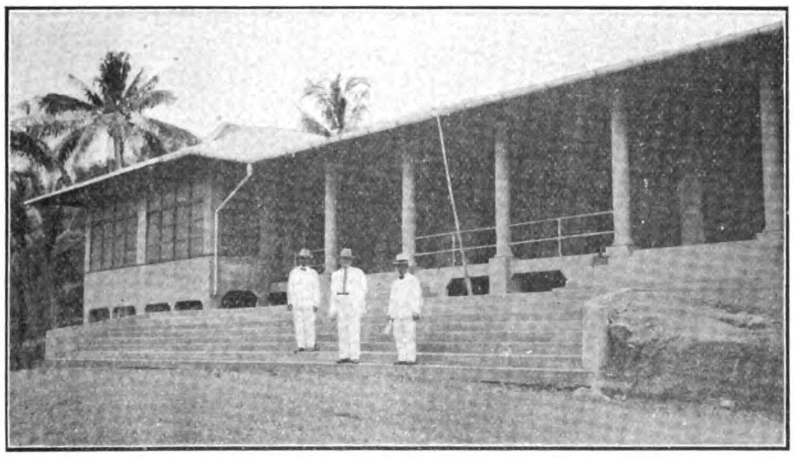
"On July first, 1911, the total amount of loans to provincial and municipal governments was P.1,345,244.97. During the year new loans placed increased the total of these investments to P.3,795,070.94. This increase was made possible by the provisions of Act No. 2083 which authorizes the insular treasurer, with the prior approval of the governor general, to invest not to exceed fifty per centum of the gold standard fund "in loans for periods not to exceed ten years to provinces and municipalities to aid in the construction of public works, particularly those of a revenue producing character, at three per centum interest per annum." This made available approximately P.9,000,000, of which one half is temporarily set aside for construction loans to the Manila Railroad Company. Therefore, approximately P.4,500,000 became immediately available for loans to provincial and municipal governments. It is to be noted that loans from the gold standard fund may be made for periods not exceeding ten years, and the interest rate is fixed at three per centum. Special funds previously made available for such loans were limited to two years in the case of the insurance fund, and to five years for other funds, and the annual rate of interest at four per centum. It is apparent that the investment of the special funds of the government in these loans is productive of greater interest earnings than could ordinarily be obtained on fixed bank deposits and the requirements enforced in placing these loans make them quite as conservative investment as would be government bonds, which in effect their securities are. Upon the enactment of the statute making available a portion of the gold standard fund for investment as stated above, a representative of the executive bureau was assigned to the special duty of investigating each project for which loan application had been received and has been giving practically his entire time to this work in the field.



OLD MARKET AT ROSALIE, PANGASINAN; A NEW MARKET IS NOW BEING ERECTED

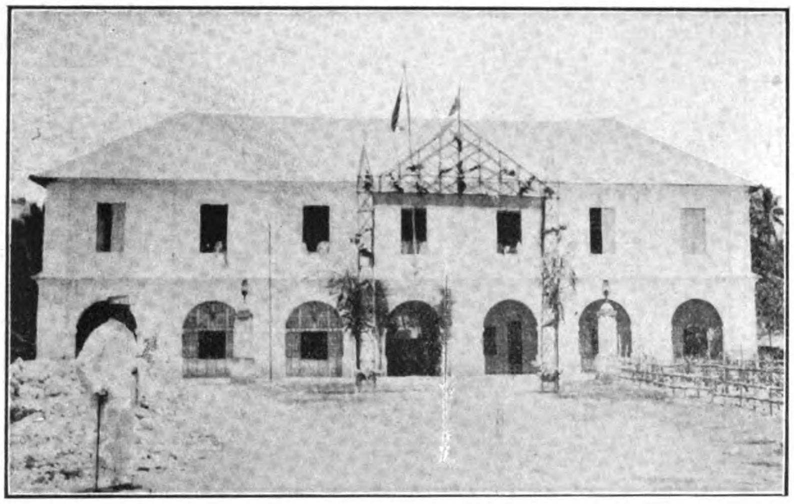
"Loans have been made to provincial governments in considerable sums to provide for the construction of permanent roads thereby advancing by from one to two years the progress of this work which is carried out in accord with the general scheme of the bureau of public works. These loans also were to a degree relief measures to provide employment for labor in those districts where the last rice crop was a partial or complete failure, and are payable within eighteen months from date of approval. Loans for the construction of bridges have been confined to those projects of great urgency and of concrete or steel construction to be executed by the bureau of public works. The cost of many of these projects will be less than the annual saving to the planters and merchants by reason of reduced cost of freight and passenger transportation by customary types of wheeled vehicles, and the consequent increased use of motor vehicles.

"Application for loans for road and bridge construction are taken up with the director of public works and his views are considered before definite action is taken by this office. Application for loans for erecting school buildings are similarly taken up with the director of education. Loans to municipalities for the construction of modern sanitary markets are given preferential consideration in accord with the terms of the statute authorizing loans from the gold standard fund, which requires that public works, "of a revenue producing character be given preferential attention." The public market in each city and village in these islands



MUNICIPAL BUILDINGS, PAGSANJAN, LA LAGUNA

INTERMEDIATE AND CENTRAL SCHOOL BUILDING, PAGSANJAN, LA LAGUNA



MUNICIPAL BUILDINGS, IFALAGUETE, CEBU

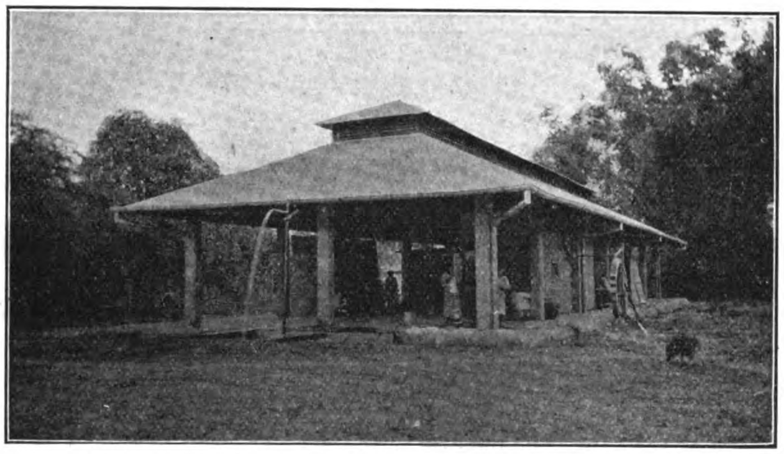
is an institution, the importance of which as a factor in the daily life of the people can hardly be understood without personal study on the spot.

"The greater number of the markets of the Philippine Islands have been of bamboo or wood and mat construction, without floor, and generally insanitary. The majority of them have been let by municipalities to contractors and the result naturally has been that the contractor bent all his efforts towards securing immediate profits, and practically nothing has been expended on the unkeep and sanitation of the market. The modern markets now being constructed are of reinforced concrete, with concrete floors and facilities for perfectly cleaning them. They are open on all sides and free ventilation is assured.

"Particular attention is given to the selection of sites for modern markets, a representative of the bureau visiting a municipality before the project is determined and aiding the municipal officials in their selection of a site and of the class of buildings best adapted thereto. Among the requirements for a market site are that it contain at least one hectare (2.471 acres) of land and have certain distinct boundaries and good drainage, and be so situated as to be convenient for both buyers and sellers. The general plan followed for market buildings provides for one or more central buildings from 12 to 30 meters in width and length suitable for the site, the main building being encircled by small bazar stalls or stores facing the central building. The buildings are constructed with concrete floors and pillars, trusses of wood or steel, and roofs of galvanized iron or tile. The stalls and stores are so arranged that they may be closed and securely locked. All entrances to modern markets are provided with iron gates, to be closed at night. In the markets of the old types persons renting space therein were permitted to use their stalls as dwellings. In the new markets no one but the caretaker may stay within the inclosure at night. It will be seen that this change in itself tends to better hygienic and sanitary conditions.

"A feature of modern market construction, second only to the expected improvement in general health conditions, is found in the increased revenue accruing to the municipality in every case where modern markets of approved type have been installed. In the case of San Pablo, Laguna, a loan was made to the municipality for the construction of a modern market which was opened to the public on June 8, 1910, and cost P.24,000. The receipts from the old market were P.2,160 per year. The receipts from the new market are at the rate of P.12,392 per annum, an increase of P.10,232 per annum, or 473 %. The increase in the annual income from the present market is 42% of the investment, and it will be noted that the municipality could repay the cost of the modern building, P.24,000, in two years, from the market receipts alone. The loan, however, was granted for ten years, and the municipality is now contemplating the installation of a water supply system estimated to cost P.85,000 for which a loan for a period of ten years will be granted. This loan can be repaid from the market receipts.

"The municipality of Angeles, Pampanga, in 1908 and 1909 received from its substantial old style market building an average annual revenue of P.4,091.00. In October, 1909, a new modern concrete market building, costing P.9,145.00 was opened to the public, and the market receipts for the following year amounted to $5,419.00, a gain of



MODERN MARKET AT SUBAO, PUMP WITH ARTESIAN WELL

P.1,328.00 or 32%, in the annual market income. This gain constitutes a return of 14% on the money invested.

"In the municipality of San Fernando of the same province, receipts from the old style market for the year July 1, 1908, to June 30, 1909, amounted to P.3,590.00. On July 1, 1909, two modern reinforced concrete market buildings, costing together P.10,679.00 were opened to the public, and the receipts for the following year amounted to P.6,472.00, an increase of P.2,882.00 or 80%. This increase constitutes 14% on the investment.

"In 1906 the municipality of Pagsanjan, Laguna, received from its former market P.3,001.00. In November of the following year a new concrete market building, costing P.19,531.00 was opened to the public. The average market income for the subsequent four years was P.5,961.00 excluding 1910, when the market was rented by contract and but P.4,551.00 was received therefor. The increase in market revenues amounted to P.2,960.00, or 98%. This modern market is paying 30% on the money invested, and the increased revenue amounts to 15% of the investment.

"The municipality of Iloilo, province of Iloilo, has a modern reinforced concrete market, opened to the public on the fifteenth of January of the present year, which cost P.69,302. The average receipts from the former market for the years 1909, 1910 and 1911 were P.13,057. Receipts from the new market, based on collections from January fifteenth to June fifteenth of the present year, will be P.25,629, or an increase of P.12,572, 96% more that the revenue heretofore. The increased market earnings amount to 18% on money invested.

"These cases are typical. Increased market revenue means to the municipality an increased borrowing capacity which permits the erection of school houses, waterworks, municipal buildings, the construction of first class streets and bridges, and other improvements; the payment of adequate salaries to teachers in primary schools; and other advances in municipal public service.

"It is the intention, when nearby towns have recognized market days, to encourage the arrangements of the daily markets in such order that it will be possible for producers to make regular rounds of the markets from town to town. With the many first class roads now being completed throughout the provinces, this will gradually build up arteries of trade and the general prosperity of the country will inevitably increase.

"An important feature of the municipal market is its effect on the economic conditions of the people as a whole. It is the expressed opinion of many uninformed persons that even the local trade of the Philippine Islands is in the hands of persons other than Filipinos, and that the Filipino has neither the business capacity nor the desire to take into his own hands the trade of his country. That this is untrue becomes apparent to any observer of conditions in municipal markets, in some of which, in the province of Iloilo, the daily sales amount to as high as P.20,000.

Practically the entire business of the markets is conducted by Filipinos.

"The largest municipal water supply system outside of the city of Manila is the Osmeña waterworks system of Cebu, which was formally opened on February 13, 1912, and much serious interest has been aroused in other municipalities in securing potable water for domestic use either from artesian wells or by

NEW MARKET AT ARAYAT, PAMPANGA

NEW MARKET, LIPA, BATANGAS

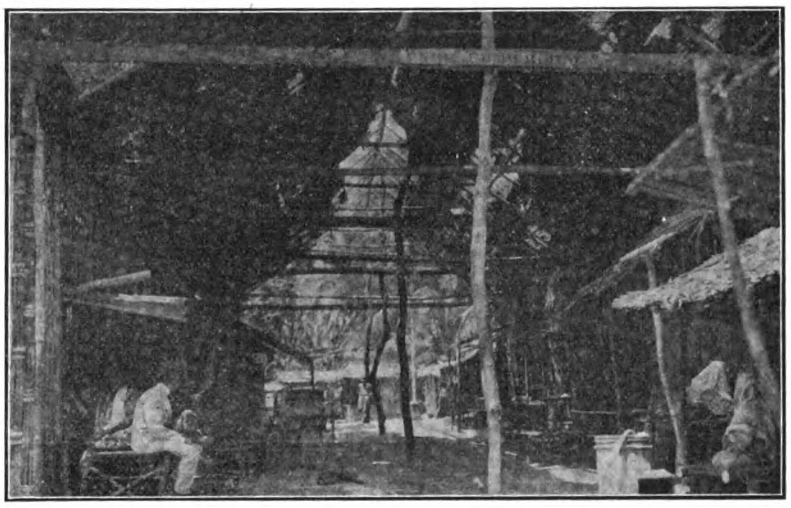
OLD MARKET AT LIPA, BATANGAS

gravity supply from streams or springs on the adjacent mountains or foothills. The advantages resulting from the standpoint of public health, low insurance rates, and in many other ways are so obvious that discussion of the desirability of devoting public funds at the earliest possible date to the supply of potable water seems quite unnecessary. One instance of the immediate financial values of an adequate water supply for reducing the fire risk, however, is so significant that it seems worthy of mention: the case of the municipality of Cebu where during the past ten years the total loss of buildings and contents burned is estimated at P.10,000,000, and during that period insurance rates increased from two and four-tenths per centum to three and five-tenths per centum and some insurance companies withdrew entirely. It is estimated that the saving to property owners in fire insurance premiums by reason of reduced rates once the new water system is in full operation will approximate P.100,000 per annum. The total cost of installing the water supply was P.550,000, and the cost of operation will be nominal.

In the report of the bureau of public works will doubtless be found detailed data regarding the Osmeña waterworks and other projects constructed and under construction during the year.

"The great facilities now at the command of the governor general for the execution of permanent improvement projects have afforded opportunity for the undertaking of systematic effort in those phases of municipal improvement which come within the class of public works as distinguished from political administration. There is in process of formation in this office a section which will devote itself to the encouragement and assistance of municipal governments in the formulation of a definite program for the location and construction, as funds become available in future, of public buildings, layouts for streets, playgrounds and other public places of proper areas and locations. It is hoped that in addition to the material results for which direct effort may be made there will be distinct betterment in the general efficiency and tone of municipal administration and urban life as results from the direct pursuit of which the insular and provincial governments are to a great degree inhibited by the autonomy granted to municipalities by organic law under which they are constituted.

"Through the kind offices of the bureau of insular affairs, there has been obtained and arrangements made for continuing to secure the best literature available on the subject of municipal betterment in the United States and in Europe. Decided interest is evidenced already in many municipalities and the circulation of periodicals and other literature pertinent to the subject is beginning to attract attention. Each provincial treasurer (the officer having immediate supervision of provincial finance) and many municipal treasurers now receive periodicals, etc., devoted to the subject under discussion. With the present trend it seems reasonable to believe that relatively as great interest will soon be taken in these islands in the improvement of municipal government and civic progress as in other countries of the civilized world. The hope for positive results necessarily must rest with the younger generation and therefore the constant effort of this office is to co-ordinate its work with that of the public schools and also to enlist the interest of the element which is just entering into political activities and will soon control public affairs in the municipalities."



MAIN MARKET BUILDING, IFALAGUETE, CEBU

THE BOXER INDEMNITY

As the Boxer Indemnity is the stick upon which Russia has seized to beat China into submission with regard to the demands of Russia in Mongolia, it is interesting to note how the Boxer Indemnity of 450,000,000 Haikwan Taels is split up among the foreign countries. The largest amount of the Indemnity goes to Russia, who, roughly speaking, takes 29%.

At the beginning of this year, China was fourteen months in arrear. The total amount due on January 1st was £3,472,000. China's financial distress prevented her from meeting this obligation. She trusted that the Big Loan would be agreed to, when she expected to have funds available not only to liquidate her debts, but also to carry out essential re-organization work. The failure to come to a settlement with regard to the loan, in conjunction with the failure of the Provinces to forward contributions to the Central Government, completely embarrassed the Treasury. There were no funds to meet the foreign liabilities, and, even for local needs, the cupboard was as bare as the famous one of nursery rhyme.

Russia, pressing for recognition of her questionable claims in Mongolia, was prompt to take advantage of the misfortunes dogging the steps of the New Republic. Russia demanded that she must have her portion of the Boxer Indemnity immediately. China previously, on December 20th to be exact, had written a note to the Ministers of various foreign countries interested in the Indemnity requesting an extension of time for the payment of the Indemnity. It is interesting to note that no Legation replied to that request, but left it to be understood that the necessary assistance would be given China in overcoming her difficulties, even Russia overtly made no difficulty until towards the end of January when she commenced to put on pressure. The following table shows the manner in which the indemnity is divided:—

	Proportion per cent.	Haikwan Taels		Foreign currency
Germany	20.015 67	90,070,515	Mks.	278,166,423 93
Austria-Hungary	0.889 76	4,003,920	Kr.	10,394,092 40
Belgium	1.885 41	8,484,345	Fr.	31,816,293 75
Spain	0.030 07	135,315	Ps.	507,431 25
United States	7.319 79	32,939,055	Dol.	20,440,778 81
France	15.750 72	70,878,240	Fr.	265,793,400 00
Great Britain	11.249 01	50,620,545	£ S.	7,593,080 19
Portugal	0.020 50	92,250	£ S.	13,837 17
Italy	5.914 89	26,617,005	Lire.	99,803,768 75
Japan	7.731 80	34,793,100	Yen.	48,950,891 70
Holland	0.173 80	782,100	Fi	1,404,651 60
Russia	28.971 36	130,371,120	Rs.	180,084,021 44
Norway and Sweden	0.013 96	62,820	£ S.	9,423
Sundry	0.033 26	149,870	£ S.	22,450 10

SHALLOW DRAFT RIVER BOATS

By C. B. STEVENSON

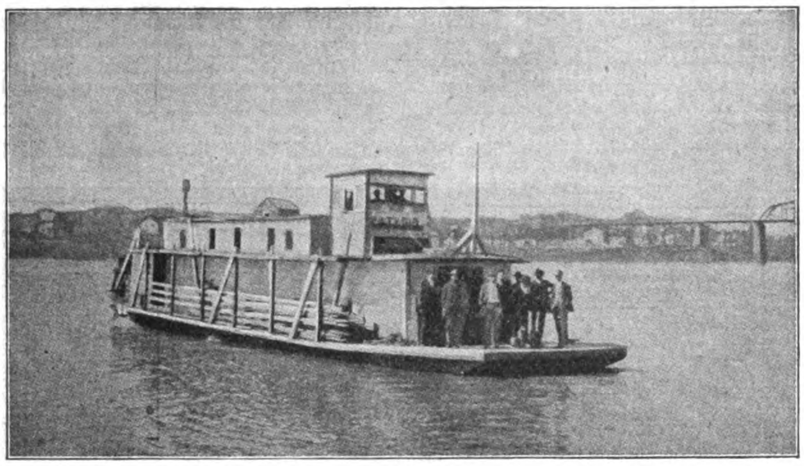
The Ohio River is the home of the shallow draft boat. There is no other stream or body of water where they form so important a factor in navigation, and any one not entirely familiar with conditions on the Ohio would be much surprised at the great number of these boats in use there. The fact that the river is very shallow for a considerable part of each season forces the majority of steamboats to tie up and leaves practically all river traffic to the small gasoline-propelled boats. And even when there is water enough for the big boats, the gasoline craft cut into the commerce and handle a great deal of freight, because they are able to make lower rates on the short trips. Their operating expenses are much lower, both for fuel and handling.

These boats vary in size, but most of them are between 50 and 100 feet in length. The draft of a boat of this type, of average size, will usually be about 20 inches when fully loaded. The larger boats are responsible for the disappearance of the picturesque small steamboats from the river. They do towing (which is really "pushing" on the Ohio, as all barges and boats are pushed ahead of the tow boat), gather provisions, merchandise and junk. They carry the mails, do ferry service and make regular packet runs. Smaller boats engage in clam shell gathering, light towing and kindred occupations.

The general type of shallow draft boat most frequently seen on the Ohio would probably look very crude to a person not acquainted with the conditions, but it has been found by much experience to be the most satisfactory and best adapted to the work. Tunnel propeller boats have been built and run with more or less success, but the prevailing method of propulsion is the stern paddle wheel. This type handles the boat much better in narrow places, and especially in backing. The type of engine in use in many of these boats forms the unexpected and incongruous part of the outfit. A number of the shallow draft boats on the Ohio River are propelled by engines of the stationary type driving the wheel through long belts and counter shaft, with sprockets and chain from this shaft to the wheel itself. Where cabin space is not important, as on boats used entirely for freight or towing, this kind of an engine and equipment gives entirely satisfactory service. Where cabin space is an object, the boats are powered by engines of the marine type, with a gear drive to the wheel. Boats used for carrying passengers, and thus equipped, frequently reach a speed of over 12 miles an hour.

With either of these types of equipment the whole mechanism of the boat is extremely simple, and, as a result, extremely effective for shallow water. The only part of the equipment requiring attention is the engine, and the engines in the great majority of these boats have proven themselves to be very easy to handle and reliable in every way.

"PRIDE OF VIRGINIA" MAKES A WEEKLY TRIP OF 320 MILES, WITH 50 TO 100 TONS OF FREIGHT. IT IS PUSHED BY A GASOLINE BOAT POWERED WITH A 20 H. P. FAIRBANKS-MORSE ENGINE



"KATYDID," OWNED AT BELLVILLE, W. VA. USED AS A PACKET BETWEEN LONG BOTTOM AND PARKERSBURG. HAS 25 H. P. FAIRBANKS-MORSE ENGINE. NOTE STYLE OF HULL. THIS IS AN OLD ONE, REMODELED UNTIL IT IS BEST SUITED FOR OHIO RIVER USE. THERE IS A LARGE CABIN OVER THE MACHINERY AND BELTS, GIVING MORE ROOM THAN IS POSSIBLE WITH ANY OTHER STYLE. THE GUARDS ARE WIDE ENOUGH TO PERMIT STORAGE OF FREIGHT

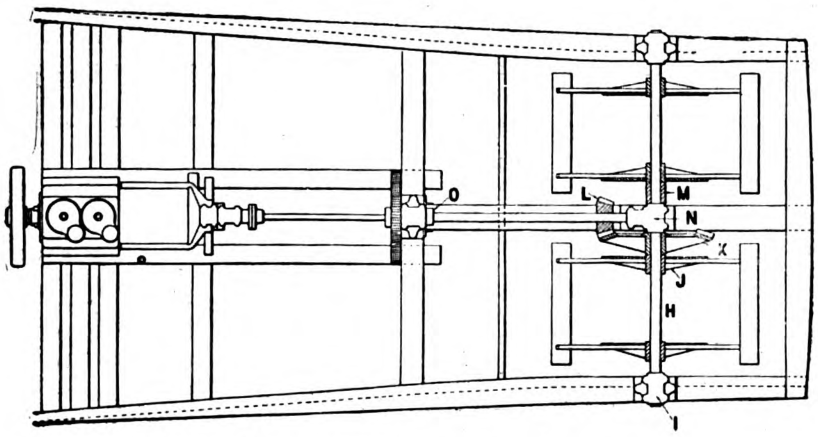


FIG. ME2431. BEVEL GEAR STERN WHEEL DRIVE

H—WHEEL SHAFT
I— ,, ,, END BEARINGS
J— ,, SPIDERS
K— ,, SHAFT BEVEL GEAR
L—COUNTERSHAFT BEVEL PINION
M—WHEEL SHAFT COLLAR
N— ,, AND COUNTERSHAFT COMBINATION BEARING
O—COUNTERSHAFT THRUST COLLAR

The speed reduction between engine and wheel is accomplished in various ways. Usually, where the stationary type engine is used, two belts drive a shaft fitted with tight and loose pulleys. One belt is crossed; the other runs straight. Usually the crossed belt is used for "go-ahead," because of its greater traction on the pulleys, and the straight one for the reverse. This shaft drives the wheel through sprockets and a roller sprocket chain. With boats driven by marine engines, the reduction is usually by gears to a jack shaft and by chain or gears from there to the wheel. A 60-foot boat of this type, with one or two barges, will handle hundreds of tons of freight at a trip. They require no wharf for landing, and hence can pick up a cargo anywhere. Usually two men handle them, and there is no necessity for either of these to have passed the severe examination which a steamboat engineer must stand.

One make of engine, both in marine and stationary types, has proven itself so satisfactory for these boats that between Pittsburgh and Cairo over 80% of the boats are fitted with them. The makers of these engines—Fairbanks, Morse & Co. of Chicago—have every reason to be proud of the record their product has made in this service. Many of these

A—ENGINE
B— ,, SHAFT EXTENSION
C— ,, ,, ,, BEARING
D— ,, ,, PINION
E—COUNTERSHAFT GEAR
F—COUNTERSHAFT
G— ,, BEARING, GEAR END

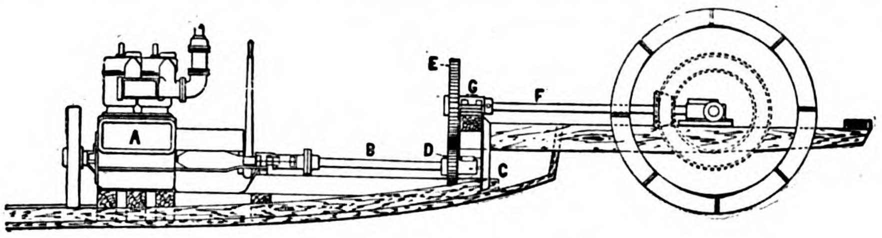


FIG. ME2432. GEAR DRIVE

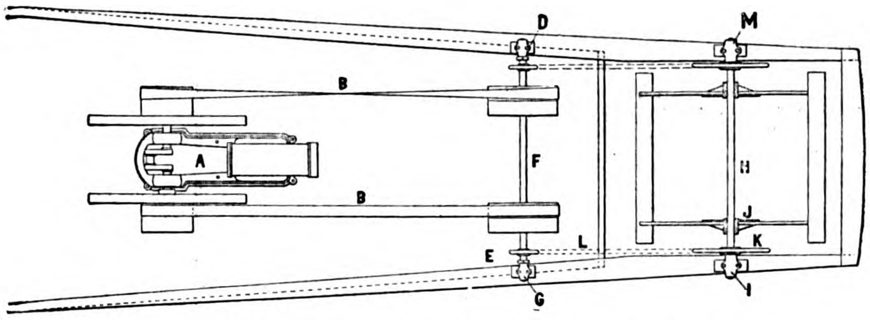


FIG. ME2435. BELT DRIVEN STERN WHEEL DRIVE

A—ENGINE
B—BELTS, STRAIGHT AND CROSSED
C—TIGHT AND LOOSE PULLEYS
D—COUNTERSHAFT COLLAR
E— ,, SPROCKET
F— ,,
G— ,, BEARINGS
H—WHEEL SHAFT
I— ,, ,, BEARING
J— ,, SPIDERS
K— ,, SHAFT SPROCKET
L—SPROCKET CHAIN FROM COUNTER TO WHEEL SHAFT
M—WHEEL SHAFT COLLARS

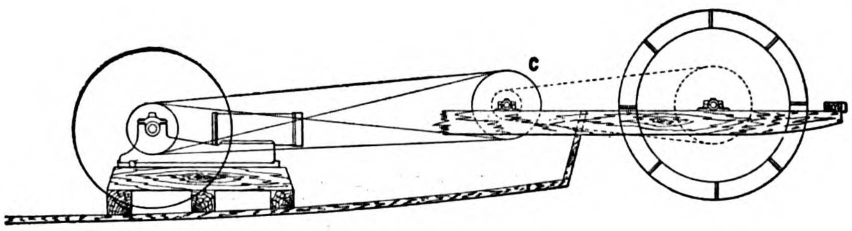
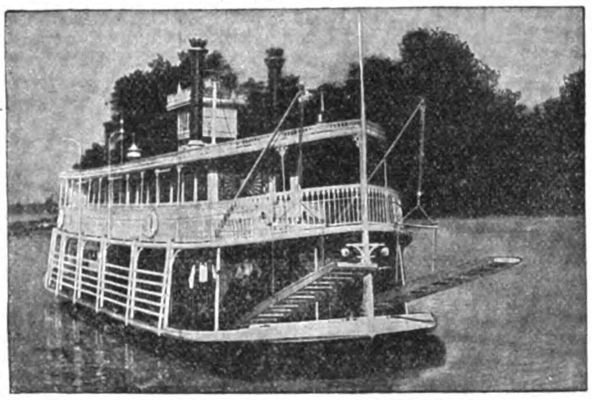
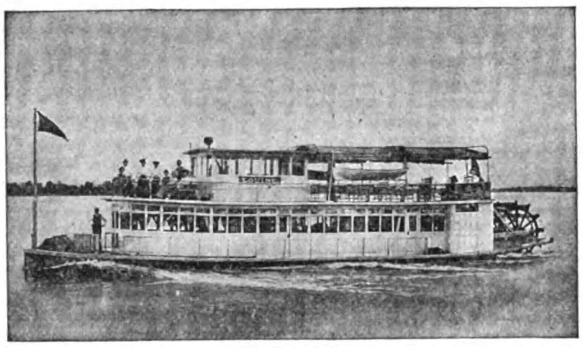


FIG. ME2436. BELT AND SPROCKET CHAIN DRIVE



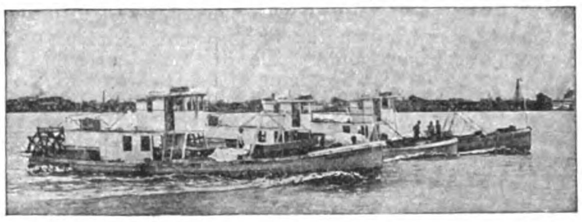
"JEFF HICKS," OF PINE BLUFF, ARK. 40 H. P. FAIRBANKS-MORSE OIL MARINE ENGINE HAS REPLACED THE OLD STEAM ENGINE



"LOUISE," 67×12 FEET, ST. LOUIS, MO. 40 H. P. FAIRBANKS-MORSE HEAVY-DUTY GASOLINE MARINE ENGINE, OPERATING STERN PADDLE WHEEL THROUGH WORM GEAR AND CRANK CONNECTION. PADDLE WHEEL WITH TWELVE 10-INCH BUCKETS. SPEED, 12 MILES PER HOUR. FAIRBANKS-MORSE ELECTRIC LIGHT PLANT USED TO OPERATE SEARCHLIGHT AND GENERAL LIGHTING SYSTEM

engines have given years of service and still do satisfactory work. So durable are they that some of them have been in service over fifteen years.

The engines installed by Fairbanks, Morse & Co. (whose Shanghai agents are the China General Engineering Co.) in these boats are of various sizes from 10 to 60 horse power, depending, of course, upon the size of boat. Regardless of type or size, they universally give splendid service. They are furnished to operate on the low grade fuels and many of these boats recently equipped are running on kerosene or the low grade distillates. This means a further reduction in fuel cost and is an added inducement for increase in the number of boats and the amount of business handled.



"AMERICAN BEAUTY," "MAGNOLIA," AND "PANSY," PART OF FLEET OWNED BY G. W. DUNBAR'S SONS OF NEW ORLEANS. EACH 60 × 15 × 3½ FEET, EQUIPPED WITH 30 H. P. HEAVY-DUTY FAIRBANKS-MORSE GASOLINE MARINE ENGINES. USED FOR TRANSPORTING SHRIMP FROM THE FISHING GROUNDS TO CANNERIES

It seems probable now that gasoline-propelled, shallow draft boats will ultimately handle all the river commerce on the Ohio. They are increasing rapidly and they are crowding the steamboats out because they are able to give service equally as good at considerably lower cost. It is merely another example of the "survival of the fittest."

FAR EASTERN RAILWAYS

CHINA

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended January, 25 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913	50,314	10,500	60,823
1912	44,452	4,625	49,077
Increase	5,862	5,884	11,746
Decrease	—	—	—

For three weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	174,397	35,809	210,206
1912	189,848	16,646	207,494
Increase.	—	9,253	2,802
Decrease	$15,451	—	—

For the week ended February 1:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913	55,914	7,830	63,744
1912	50,601	5,809	56,410
Increase.	5,313	2,021	7,334
Decrease	—	—	—

For four weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	230,311	43,729	274,040
1912	240,449	23,455	263,904
Increase	—	20,274	10,136
Decrease	10,138	—	—

For the week ended February 8:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	41,072	3,163	44,235
1912....	53,371	5,553	58,924
Increase.	—	—	—
Decrease	12,299	2,390	14,689

For five weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	271,383	46,892	318,275
1912....	293,820	29,008	322,828
Increase.	—	17,884	—
Decrease	22,437	—	4,553

For the week ended February 15:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	46,732	6,514	53,246
1912....	54,982	4,009	58,991
Increase.	—	2,505	—
Decrease	8,250	—	5,745

For six weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
[illegible]	318,115	53,406	371,521
[illegible]	348,802	33,017	381,819
[illegible]	—	20,389	—
[illegible]	30,687	—	10,298

The Hunan Line.—It is reported that some progress in the negotiation for a British loan of Tls. 10,000,000 between the Hunan Railway authorities and the China Development Corporation seems to have been made. The money is needed for the building of the railway from Chengchow to Ch'angteh, in Hunan. An Englishman has left Shanghai for that province to make a personal inspection of the line in question. If he should find it as described to him Tls. 4,000,000 will be paid over as a first instalment on his return.

The New Railway in Kwangtung.—The railway, built by Chinese engineers, and financed by the Chinese themselves, which will join Pak Kaai, the great port on one of the largest branches of the Canton river, to Hongkong by river steamer, has pushed its way some tens of miles further towards completion, and it is now opened for traffic as far as the city of Kongmun, which is only three miles from Pak Kaai.

Hsuchowfu-Tsingkiangpu Line.—It is understood that a party of engineers, Chinese and foreign, left Shanghai recently with northern Kiangsu as their objective. The visit is in connection with the projected railway from Hsuchowfu to Tsingkiangpu, and it is reported that their intention is to make the necessary purchases of land for the line if this can be done.

Szechuan-Hankow Line.—In Chengtu a public meeting has been held by the shareholders of the Szechuan-Hankow railway The shareholders decided to utilize their funds for the construction of lines in connection with the main line.

By the order of the Ministry of Communications Mr. Chang Li-ken has been despatched to institute a survey and an estimate of the railway between Shasi and Ichang; Mr. Tuan Mu and others are to construct the branch lines from Pinghsiang to Chang-shu-tung.

The Hukuang Line.—A correspondent writes to the *China Mail* from Canton as follows:—We hear that another section of the Canton-Hankow Line has been opened and to-day it is possible to get as far as Yingtak. There was some delay and difficulty in laying this line along the pass known as the Blind Boy's Pass, because the track was very rocky, and there was some tunnelling to be done. But whilst work went on slowly here, farther on, the line was pushed forward, so that when this difficult section was conquered, little delay was expected, and so it has turned out. Unfortunately the station at Yingtak is some distance away from the city. It appears that the west river—that is a branch of the North River, not the West River—is the cause of this. In other words, the line had to cross this river, and near the mouth, which is just opposite the district city, the river was too wide to be bridged. At any rate it was found to be much easier to run the bridge across farther up the stream, and so the line was carried along some distance from the city. Reports affirm that already the line is popular, and those who aforetime went by boat, and were compelled to creep along, are now able to go at a great speed, by comparison, though at present probably the fastest train does not travel more than from fifteen to twenty miles per hour. The report of the opening of this section of the line goes on to say that before the year has run its course the line will be opened all the way to the district city of Shiu Chow. Much of the track is already laid, and it remains only to link up the several sections, whereupon there will be a direct track from Canton to that district city.

A Chenchow correspondent wrote on December 18:—Mr. Dees and his party of 300 have passed through Chenchow on the survey of the Canton-Hankow railroad. From here the party goes to Kweiyangchow and down the Kwei River; there is some prospect that the railway will follow that river instead of the Lei; in any case the road will come to Chenchow, and that is a source of great satisfaction to all here.

Earnings of Chinese Railways.—According to the *Sinwanpao* the total earnings of the different Chinese railway lines were as follows:—

Railway Lines:—	$
Peking-Mukden	13,000,000
Peking-Hankow	12,400,000
Peking-Kalgan	2,800,000
Tientsin-Pukou............	4,000,000
Shanghai-Nanking	2,600,000
Honan-Loyang	700,000
Kowloon-Canton	600,000
Chenting-Taiyuan	2,400,000
Tao-ching Railway	500,000
Kirin-Changchun	200,000
Chuchen-Pinghsiang	270,000

The Lotung Railway.—The first section of the Lo-tung Railway from Lo-yang to Tieh-men having been completed, the Director of the said Railway has arranged to run daily passengers and goods trains between these two stations, a distance of 100 Chinese *li*. The Lo-tung Railway Company, having decided to bring about the whole line to completion with the least possible delay, 480 *li* in all, has now employed additional staff in the Engineering Department. The Chief Engineer Mr. Hsu Wen-chong, may be remembered as the builder of the Kiangsu Railway, which was opened to traffic 3 years ago.

The *Asiatic News* reported early in February that there being deficiency of funds the Lo-tung Railway Company requests permission to contract a loan of £500,000 with a certain company in Tientsin.

Yeungkong-Kongmoon Line.—The progress of this line is being retarded by a quarrel about a bridge over the river between Sanui and Kongmoon. There has been a good deal of delay over the building of this structure, and the train does not run any farther than Kongmoon city, which is some four or five miles away from the terminus; that is, the Customs Station at Kongmoon. The river runs through this section. An influential body of men signed a petition, and sent it in to Headquarters, Canton, asking that the bridge be not allowed, but the reply was that the company was to see to it that the work of constructing the bridge was put through at once, for it is too late in the day to let the prejudices of the few in the vicinity hinder this important work.

The Lung-Tsing-U-Hai Line.—The Belgian Honanfu-Kaifengfu Railway Bonds were to be issued in Belgium on February 18. One million francs bargain-money was to be paid over to the Chinese Government simultaneously. China will use this amount to purchase the portions of railway near Honanfu which are being built by private enterprise.

MANCHURIA

Hsinmintun-Fakumen Light Line.—Governor Chang-hsi-lan is said to have been authorized to build a light rail line for military use between Hsinmintun and Fakumen. Engineers have been sent out to start a survey of the proposed line.

Kirin-Hailungcheng Line.—Mr. Chi-shih-min, chairman of the Kirin Industrial Guild, has mooted the project of constructing on share capital a railway from Kirin to Hailungcheng via Panshih-hsien. He is reported to have succeeded in inducing Chinese capitalists in the South Seas to subscribe to two-thirds of the required capital. All that is left to be done is to raise the remaining third locally, and when this sum is raised, which is, however, considered no easy task in view of the prevailing stringency in the money market, the promoters intend to start work without delay.

South Manchuria Railway.—January, 1913, was the most prosperous month for the S. M. Railway. The traffic receipts alone averaged Y.87,748 per day, being an increase by Y.1,108 over those for the corresponding month of last year. The average mileage receipts reached Y.126⅛ per day. Owing to the Chinese New Year Season, the returns for the last decade of January showed a slight decrease, gaving a daily average of Y.81,866, which was, however, still larger than the corresponding period of last year by Y.1,162.

JAPAN

Tokaido Double Line.—A dispatch from Nagoya says that the construction of the iron bridge with the double line over the River Kiso having been completed the section will be put into active use for traffic immediately. Now the only section with the single line on the Tokaido line left is the iron bridge over the river Tenryu. But as the bridge over the river Tenryu is expected to be completed this March the whole of the Tokaido line will be doubled in the near future.

MONGOLIA

Russian Military Railway.—Russia has constructed a military railway from Harkatu to Urga and the whole line is divided into four sections, on each of which a barrack has been erected.—*Chinese Report.*

CHOSEN (KOREA)

Seoul-Gensan Line.—Sixty-one miles of the railway to Cholwon, a station on the new line between Seoul and Gensan (Wonsan) have been completed and opened to traffic. At the Gensan end of this line about 10 or 15 miles of road are now being operated, and vigorous work is being prosecuted on the intervening route. It is expected that through communication between Seoul and Gensan will be available for trains by November, 1913.

STRAITS SETTLEMENTS

Straits Settlements Railways.—Beginning on January 1, 1912, the railways of the Straits Settlements came under the management of the Federated Malay States Government. The terms called for a lease of 21 years at an annual rental of $95,200, subject to septennial revision. It is proposed to sell the railways to the Federated Malay States Government, and a joint committee has been considering the question of the price to be paid.

SIAM

Siam Railways.—The following from Mr. Williamson's annual report on the Siamese Budget states that as regards the Northern Railway, it will be seen that the expenditure is estimated to be Tcs. 2,650,000 against last year's figure of Tcs. 1,315,000—that is to say, the allotment has been rather more than doubled. The explanation of this is that it has now been decided to push on with the construction of the line in question as far as Chiengmai, the chief town of Northern Siam. It will be remembered that in previous reports it was stated that, owing to the difficult and less-paying nature of the country which the railway had then reached, it had been arranged for construction to be temporarily suspended when the line had advanced to a place called Dene Chai, about 223 kilometres south-east of Chiengmai. This was done in the interests of railway finance, in order to prevent any serious diminution in the dividend paid by the line; for it is obvious that a rapid and continuous extension through the less thickly populated parts of the country must, unless time is allowed to develop traffic, adversely affect the dividend-paying capacity of the whole railway. The necessary period for this purpose having now elapsed, it has been deemed opportune to continue the work of construction northwards: hence the increased allotment this year, which is made out of the unexpended balance of the last loan of £3,000,000 taken in January (1907). For the main line of the Southern Railway, which is being built out of the £4,000,000 loan arranged for at the time of the Anglo-Siamese Treaty of three years ago, there is also an increased provision of over 2 million ticals—the allotments for the current year amounting to the large sum of Tcs. 8,630,000. In the case of the branch lines of the Southern Railway, a sum of Tcs. 1,200,000 odd is shown for the first time as expenditure chargeable to loan funds, and a word of explanation may be offered as to this. These lines, as stated in last year's report, have hitherto been constructed out of the money received from the Federated Malay States Government in repayment of the loans formerly granted by Siam to the ceded States of Kedah, Kelantan and Perlis. These loans (to the amount of about 5 million ticals) having been made by the Treasury, were paid back to the same source when refunded. The branch lines have, therefore, up to the present, been constructed from Treasury Reserve funds. Their total cost, however, is estimated at nearly 8¼ million ticals, while the sum available out of the refunded loans amounts to about 5 million ticals only, as already mentioned; hence it became necessary, on the exhaustion of the latter (as has taken place this year), to find some other source from which the balance of the cost of construction could be met. It has accordingly been arranged, for the time being, to provide the money out of the remainder of the loan funds still in the hands of the Government—the intention being to raise a fresh loan, at some future date, to cover this expenditure and to meet the further sum required to complete the Northern line to Chiengmai.

SIBERIA

The Amur Railway.—The Tsar has addressed to the Governor-General of the Amur Region a message of congratulation on the progress of construction of the Amur Railway, and has expressed his thanks to all Russians engaged on the works. Credits amounting to over 750 million roubles (£75,000,000) have been voted for this enterprise during the last five years. There is reason to believe that the railway is expected to be completed in 1915, or, at latest, in 1916. The section as far as Blagoveshchensk will probably be opened for traffic in the course of this year.

TRAMWAYS

Shanghai Tramways. (Foreign Settlement.)—The returns of the Shanghai Tramways (Foreign Settlement) for month ended January 31, are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$68,406.02	$60,877.06
Passengers carried	3,325,303	3,013,019
Car Miles run	223,899	226,601

The loss by exchange of subsidiary coinage for the month was $16,579.04 equal to 20.82% of the gross cash collected on the cars as compared with $18,337.62 equal to 24.84% for the corresponding month last year.

The returns of the Shanghai Tramways (Foreign Settlement) for the week ended January 29 are as under:—

	1913.	1912.
	$	$
Effective receipts (after deducting loss by exchange)	15,176.55	13,216.87
Passengers carried	743,932	658,456
Car miles run	50,350	51,124

The loss by exchange of subsidiary coinage for the week was equal to 21.38 per cent. of the gross cash collected on the cars as compared with 25.11 per cent. for the corresponding week last year.

For the week ended February 5:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$18,120.54	$14,535.09
Passengers carried	898,812	720,045
Car miles run	55,552	51,191

The loss by exchange of subsidiary coinage for the week was equal to 21.50% of the gross cash collected on the cars as compared with 24.67% for the corresponding week last year.

For the week ended February 12:—

	1913.	1912.
	$	$
Effective receipts (after deducting loss by exchange)	15,692.71	14,240 77
Passengers carried	745,213	697,692
Car miles run	47,947	51,852

The loss by exchange of subsidiary coinage for the week was equal to 22.56 per cent. of the gross cash collected on the cars as compared with 23.02 per cent. for the corresponding week last year.

For the week ended February 19:—

	1913.	1912.
	$	$
Effective receipts (after deducting loss by exchange)	15,210.90	15,655.66
Passengers carried	750,250	774 811
Car miles run	50,661	56,544

The loss by exchange of subsidiary coinage for the week was equal to 22.79 per cent. of the gross cash collected on the cars as compared with 24.59 per cent. for the corresponding week last year.

A Hankow Tramway.—The *Ta Han Pao* reports that a tramway car company has been organized at Hankow and that orders have already been sent to Shanghai for the purchase of material.

Peking Tramways.—It is reported that the Peking Tramway Company has raised a loan of two million francs from a French Bank.

PERSONAL

Mr. Hugh Horne, Acting British Consul at Shimonoseki, has been appointed Vice-Consul at Kobe, vice the late Mr. A. F. Firth.

Mr. Crawford M. Bishop has been appointed, by the Department of State at Washington, to the position of Deputy Consul-General of the United States at Tientsin. Mr. Bishop has taken over his new duties.

Mr. S. Sakaguchi, Vice-Manager of the Fushun Colliery, has been ordered to visit Europe, America, and India on an educational tour, and will leave the Colliery shortly first for Europe, via Siberia.

Mr. W. Trautschold, new Russian Consul at Dairen, transferred from Hakodate, has arrived at Dairen. He was very popular, especially with the Japanese authorities, during his previous tenure of office at Dairen as Acting Consul prior to the arrival of M. K. Bologovskoy as Consul.

The decoration of the Felicitous Grain has been bestowed by the Chinese Government upon Mr. E. G. Byrne, of the firm of Schiele and Byrne, Hankow, also upon Messrs. J. Archibald sr. and J. A. Brailsford of the "Central China Post."

Mr. O. Mueller, who was long at Tientsin as engineer in charge of the Siemens-China office, has gone home on promotion to the head office in Germany.

The appointment has been announced of Judge James C. McNally, American consul at Tsingtau, to be consul at Hanover, Prussia. Mr. McNally was formerly American consul at Nanking and was a close friend of the late Viceroy Tuan Fang.

The Order of the Crown of Italy has been bestowed on Don. U. Theodoli, of the Chinese Maritime Customs at Hankow. This was in recognition of the services rendered by Mr. Theodoli to the Military Attache during the revolution.

The *China Critic* states that Mr. T. W. Tuckey, the Railway Engineer, who has been in charge of the construction of the Southern portion of the Tientsin-Pukow Railway, has been appointed consulting Engineer to the committee for laying out the port and town of Pukow, the southern terminus of the Tsin Pu line.

Mr. N. C. Sahlin, commercial attache to the Swedish Legation, has returned to Tokyo after his leave of absence.

Mr. Alexandre Mariani, the new Secretary of the Italian Embassy, has arrived at Tokyo.

Mr. E. A. Herrera has assumed charge of the Vice-Consulship of Argentina at Kobe.

Dr. Kuehne, German Vice-Consul at Yokohama has been promoted to take charge of the Consulate-General, succeeding Mr. von Syburg.

Mr. Moritz de Szent Ivany, who has been appointed to succeed Baron Franckenstein as Councillor to the Austro-Hungarian Embassy, has arrived at Tokyo.

Mr. J. van Haute, Consul for Belgium in Hankow, has been transferred to Batavia. Mr. Nemery from Peru will be Mr. van Haute's successor in Hankow.

Mr. S. Kurokawa, of the Nippon Yusen Kaisha office, Shanghai, has been transferred to the Tokyo office. His successor as, assistant manager, is Mr. S. Yasuda.

Mr. S. K. Hornbeck, Ph.D., has gone to Mukden to take up a professorship in the Fengtien Law College.

Mr. Harry de Gray, Chairman of the Shanghai Municipal Council, left for the United States in January. A large number of the Sikh branch of the Police were drawn up on the Customs jetty in honour of the highly esteemed chairman.

Mr. H. G. Baugh, who was in charge of the U. S. Consulate at Saigon, passed through Shanghai recently in company with Mrs. Baugh, on his way Home. Mr. Baugh has retired from the Consular service, and is to devote his activities to other work. Another member of this service who is at present missed in the Far East is Mr. Hamilton Butler, who was in the Consulate at Canton, and, it will be remembered, was formerly Mixed Court Assessor at Shanghai. He has likewise gone to the States.

The appointment of Mr. Maxime de Stoutz as First Secretary of the Swiss Legation at Tokyo is now officially announced. The new Secretary is successor to Mr. Henry Stroehlin, who has been transferred to Paris as Second Secretary of the Legation. Mr. de Stoutz is shortly expected in Tokyo.

Mr. F. G. Sale, managing director of Messrs. Sale and Frazar, Ltd., will entirely retire from business on April 30, and with his family leave Japan for England early in May.

Mr. C. E. Sargent, Vice and Deputy Consul of the U. S. Consulate at Newchwang has left for America on home leave.

Mr. D. McColl has resumed control of the Shanghai tramways after a trip to England.

Mr. P. Von Buri, who for the past six years had been Consul-General at Shanghai, left by the German liner *Bremen*, on February 15, accompanied by Mrs. Von Buri, for Berlin. Mr. Von Buri has been appointed Minister at Siam and will take up his duties shortly.

The marriage of his Honour Sir William Rees Davies, Kt., Chief Justice of Hongkong, to Hilda Kathleen Chaplin, second daughter of the late Mr. W. E. Blennerhassett Atthill, of Faversham, Kent, was solemnised on February 11 at the Peak Church, Hongkong, by the Reverend G. B. Berry, M.A. Sir William and Lady Rees Davies left immediately after the wedding by the s.s. *Goeben* for a fortnight's stay in the Philippine Islands.

The Hon. Mr. E. Osborne left Hongkong for good on February 8 after thirty years residence in the Colony.

Mr. K. Inouye, heir of Marquis Inouye, has been nominated Japanese Ambassador to London, in succession to Baron Kato.

Mr. Frank Beckwith, who was appointed Engineer-in-Chief to superintend the construction of the American section of the Hukuang Railway was entertained on January 22 in New York, prior to his departure for China by Mr. Willard D. Straight who, as representative of J. P. Morgan & Co., negotiated the Hukuang loan, at a luncheon. Among those present were Mr. Silas D. Webb, president of the China and Japan Trading Company; Mr. William Barclay Parsons, who was connected with the Canton-Hankow Railway under the old American concession; Mr. James R. Morse, president of the American Trading Company; Mr. E. P. Thomas, president of the United States Steel Products Company; Mr. H. T. S. Green, president of the International Banking Corporation, and a number of other financiers and business men having interests in China and the Far East. It is understood that Mr. Beckwith was appointed upon the recommendation of the American Society of Civil Engineers. Mr. Beckwith arrived in Peking towards the end of February.

COMPANIES

Hongkong and Kowloon Wharf and Godown Co., Ltd.—The Hongkong and Kowloon Wharf and Godown Co.'s Accounts for 1912 shew a balance at credit of Profit and Loss account of $518,490.91 which, subject to audit, the Directors recommended should be disposed of as follows:—

To pay a dividend of 7% from Working profits	$210,000.00
To pay a bonus of 2% from profits on sales of property	60,000.00
Write off Wharves, &c.	76,791.17
Transfer to Equalization of Div. fund	150,000.00
Carry forward	21,699.74

Soy Chee Cotton Company.—The Directors report recommended the shareholders to apportion the balance at credit of Profit and Loss Account on December 31st, 1912, of Tls. 172,082.24, as follows:—

To pay a dividend of Tls. 5 on 20,000 shares Tls.	100,000.00
To place to dividend equalization fund Tls.	27,000.00
To write off for depreciation Tls.	25,000.00
To 10 per cent. commission to General Managers Tls.	16,024.66
To carry forward to new account Tls.	3,157.58

Tokyo Gas Company.—The Tokyo Gas Company submitted the following accounts to a general meeting of its shareholders held on January 20:—

	Yen.
Profit for the half year	1,575,156
Amount brought forward	11,689
Total	1,586,845
Royalities (6 per cent.)	94,509
Bonus and table expenses of officers (2 per cent.)	31,503
Funds for pensions (1 per cent.)	15,751
Reserves (5 per cent.)	79,000
Special reserves (5 per cent.)	79,757
Dividend (10 per cent,)	1,270,000
Amount carried forward	16,323

Hongkong Hotel—The profit of the Hongkong Hotel Company, Limited, for the half year ended 31st December, 1912, amounted to $85,618, which subject to audit, the Board of Directors proposed to apportion as follows:—

To pay a dividend of $3.00 on 12,000 old shares	36,000
To pay a dividend of $1.50 on 8,000 new shares	12,000
To write off Furniture and Fixtures account	15,000
To write off Electric Light Installation account	10,000
To transfer to Repairs and Renewals account	10,000
To write off Hotel Launch account	1,000
Carry Forward	1,618
	$35,618

Kowloon Land and Building Co., Ltd.—The twenty-fourth report of the board of directors of this company states that the balance of profit and loss account for the year, including $465.02 balance brought forward from last account, after writing off all charges and expenses, amounted to $18,156.45. The directors recommended that a dividend of $2.80 per share be paid, which, after providing for directors' and auditor's fees, would leave a balance of $806.45 to be carried forward to the credit of a new profit and loss account. Directors: Messrs. T. F. Hough and J. M. E. Machado retire by rotation, but offered themselves for re-election. Auditor: Mr. R. C. Edwards having resigned on leaving the Colony the accounts were audited by Mr. A. C. Hynes.

Osaka Shosen Kaisha.—The half-yearly general meeting of the Osaka Shosen Kaisha on January 24 approved the dividend for last half-year at the rate of 9 per cent. per annum and re-elected Messrs. Sugimura and Hanta Ryotaro as auditors. Afterwards Mr. Nakabashi, president of the company, said that the activity of marine transport business lately prevailing had improved the position of the company, so that it was enabled to set aside a sum of Y.1,500,000 to form a reserve for equalisation of dividend after paying a dividend at the rate of 9 per cent. He believed that it would not be difficult to obtain the same satisfactory result for the present period. The Indian service of the company, the opening of which had long been under consideration, was inaugurated last month, and a full cargo was secured. This service would be continued regularly once a month. Mr. Nakabashi added that the company consulted the Nippon Yusen Kaisha and joined a conference of the steamship companies on the service between Japan and Bombay.

Hongkong, Canton and Macao Steamboat Co., Ltd.—At the Half-Yearly Meeting of Shareholders of the Hongkong, Canton and Macao Steamboat Co., Ltd., held on 11th February, the Directors recommended that a dividend for the half-year of One dollar per share, or $80,000, be paid to shareholders; $25,000 be written off the book value of steamers; $10,000 be written off value of wharves, properties and lighters; $5,000 be transferred to credit of Special Repairs Fund, leaving a balance of $22,845.88 to be carried forward to new account.

Brazilian Emigration Co.—The organization of the Brazilian Emigration Company (Japanese) is stated to be progressing. Of the total shares (20,000 representing 1,000.000 yen) 12,000 have already been subscribed. The subscription is to be closed on the 15th of March next and subsequently there will be held an organizing general meeting for the drafting of the articles of association and election of directors. The head office will be opened in Tokyo and a branch established at Iquape, Soo Paulo, Brazil. The land, which was offered by the Brazilian Government to the Tokyo Syndicate as a free grant is said to cover an area of 122,500 acres, and is located in Iquape.

Okura Saw Mills, Ltd.—The Okura Saw Mills, Ltd., has been organized at Antung on the subscribed capital of Y.200.000, of which sum one-half is to be called up, to start with. The following officials have been elected:—Mr. N. Izaka, President; Mr. S. Shikimura, Managing Director; Mr. K. M. Okura and Mr. Shimizu Directors. When the mills now in course of construction at Liutaokou, near Antung, are opened to operation, those hitherto worked by Messrs. Okura & Co. at Shahochen and Yongampho will be shut down.

FINANCIAL

Banking in Japan.—During the latter half of 1912, 2,212,743 bills, representing 2,071,299,376 *yen*, were cleared at the Bankers' Clearing House in Tokyo, being an increase over the preceding half year of 188,653 bills, amounting to 148,050,649 *yen*. The year's totals show an increase over the previous year of 11$\frac{1}{10}$ per cent. and 11$\frac{4}{10}$ per cent., in the number and amount of bills. During the last half year 496 persons were declared defaulters at the Clearing House, showing an increase of 155 persons over the corresponding period of the preceding year.

Japanese Government Loan.—The Japanese Government is said to be contempleting the raising of a loan of from 150 million to 200 million yen to be employed as an agricultural fund. As an instalment of the scheme loan bonds for fifty million yen will be placed on the London and Paris markets shortly.

Tokyo Municipal Loan.—It is announced that the Electric Bureau of the Tokyo Municipality has planned to issue a big loan of 15,500,000 yen for the expansion of its works both tramway and electric light. Whether it will be issued at home or abroad, and the date of issue, are as yet unsettled. 5 per cent. may be probably the rate of interest for the new loan.

Water Power Loan.—Another loan of 3,500,000 yen is to be shortly issued for the Kinugawa Water Power Co. as was decided at the company's last general meeting on Dec. 29th. 2,000,000 yen will be issued in Tokyo and the rest 1,500,000 yen in Osaka. The underwriters in the former city are the Kitahama and Masuda banks, and those in the latter the First, Teikoku and Nippon Life Insurance Companies.

Hokkaido Development Bank.—Mr. Minobe, President of the Hokkaido Development Bank, speaking at a general meeting of shareholders said that the increased stringency of the money market during the past term had caused a corresponding dullness of trade in the Hokkaido, but the work of development had not suffered the slightest decline. The demand for capital continued to increase. The applications for fixed loans and loans for repayment by annual instalments amounted, together with those brought over from the preceding year, to 6,159, representing 6,987,394 *yen*, of which 5,358 representing 5,982,994 *yen* were settled, resulting in fresh loans of 3.490,547 *yen*, the total loans at the end of last year showing an increase over those of the previous year of 1,835,850 *yen*. The results of the term's working showed a slight improvement over those for the preceding year. The following are the Bank's accounts for the term just ended:—

	Yen.
Profit	302,300.405
Reserves for loss	80,300.000
Reserves for equalization of dividends	15,200.000
Dividend	130,500,000
Bonus	12,580.000
Amount carried over	63,729.475

Japan Industrial Bank.—The ordinary general meeting of the Japan Industrial Bank was held on February 8. Mr. Tsukuda, the Chairman stated that the amount of investment made by the Bank during the period, was 18,970,838 *yen* in national bonds and local debentures, 5,242,701 *yen* in company shares and debentures, 3,862,719 *yen* in gold and silver mines, and 49,169,956 *yen* in various lines of business enterprises, making a total of 77,246,204 *yen*, an increase of 1,852,883 *yen* over the amount invested during the previous period. The gross earnings during the period amounted to 2,639,319 *yen*, the figure including the balance brought over from the previous account. After writing off the disbursement of 1,738,132 *yen* from the above mentioned sum, there remained 901,187 *yen*, which represented the actual net gain of the bank during last term. From this net gain the bank proposed to distribute the usual dividend of 8 per cent. to shareholders. The following plan of accounts and distribution was subsequently submitted and unanimously adopted:—

	Yen.
Gross receipts	2,595,313
Balance brought over from the previous term	44,000
Total	2,630,319
Disbursements	1,738,131
Net gains	901,187

This was distributed as follows:

Reserve against losses	105,200
Reserve for equalisation of dividend	20,000
First dividend (5% per annum)	437,000
Bonus to officials	25,000
Second dividend (3% per annum)	262,500
Balance carried forward to next account	51,187

Hongkong and Shanghai Banking Corporation—The ninety-fifth report of the court of directors stated that for the half-year ending 31st December, 1912, the net profits including $1,960,288.64, balance brought forwards from last account, after paying all charges, deducting interest paid and due, and making provision for bad and doubtful accounts, amount to $5,031,435.48. The directors recommended the transfer of $200,000 from the profit and loss account to credit of the silver reserve fund, which fund would then stand at $17,200,000, and writing off Bank premises account the sum of $200,000. After making these transfers and deducting remuneration to directors there remainded for appropriation $4,616,135.48, out of which the directors recommended the payment of a dividend of two pounds sterling per share, viz., £240,000, and a bonus of five shillings sterling per share, viz., £30,000, amounting in all to £270,000, which at 2/$\frac{7}{8}$, the rate of the day, would absorb $2,605,025.13. The balance, $2,011,410.35 was to be carried to new profit and loss account.

A SIX PER CENT. CHINESE "PUBLIC LOAN"

The Chinese Government has been placed in grave difficulty by the delay in the flotation of the expected Reorganisation loan of £25,000,000, and finds time passing apace with no prospect of the arrival from foreign sources of the wherewithal necessary to meet outstanding engagements. That the Government will have to think seriously very shortly is obvious. The Minister of Finance, pressed on all sides for funds to carry on administrative work, scarcely knows where to turn. Endeavors to raise loans abroad have failed, no financiers being prepared to take the risk of conflicting with the wishes of the foreign governments, and China has been thrown back on her own resources. As yet the Government has made no declaration to the provinces on the loan situation, but with the hope of raising some money to tide over the period which promises to elapse before the Foreign Governments settle their conflicting claims to representatives on the advisory staff, the Minister of Finance has made suggestions to meet the difficulty. One is to float a 6% loan, another to enforce a tax on incomes, and a third is to establish a transportation company.

Of the proposals the loan is about the most simple, and as the last Minister, Mr. Hsiung Hsi-ling had prepared a loan scheme (ostensibly with three definite objects in view), it was decided to promulgate it. The "Government Gazette" of February 19, therefore, contained the scheme, and the Government now look to the Chinese people to subscribe the amount, asked for, though if the fate of previous patriotic loans is to be taken as a criterion the Government is doomed to disappointment. As a matter of record we give a translation of the details of the loan:—

THE 6% PUBLIC LOAN OF THE FIRST YEAR OF THE REPUBLIC OF CHINA

1. In order to carry out the three following items of reform, the Government shall raise a public loan of $200,000,000. The loan shall be styled the "6% Public Loan."

(*a*) To increase the capital of the Bank of China.

(*b*) To liquidate the small loans on short periods.

(*c*) To reform the Government paper currency of the provinces.

2. According to the demand, the Minister of Finance shall fix the amount to be raised and the price of the bonds from time to time.

3. Upon each occasion, the amount, the price, the date and the payment decided by the Minister of Finance shall be published previously in the "Government Gazette."

The lowest purchasing price of the said bonds shall be $92 on each $100 face value.

4. If at any time the amount required be over-subscribed, the Minister of Finance shall issue bonds to the highest bidder, till the fixed amount is taken up. If the prices offered be equal, the numbers of bonds applied for by the respective purchasers shall be proportionately reduced according to the amount fixed.

5. There shall be four denominations for the bonds:—

(*a*) $1,000. (*b*) $100. (*c*) $50. (*d*) $10.

6. The payment of the bonds shall be made by the purchasers by instalments. Should the payment be overdue, from the time overdue till the time of payment an annual interest of seven per cent shall be charged. In the case of those purchasing $10 bonds the payment shall be made at once. If three months after the period of full payment be due, the money is still unpaid, these bonds shall be purchased by the Government which may refund the money already paid by the purchasers in question, less the interest and other charges fallen due.

7. The interest on this public loan shall be 6%.

8. No names of purchasers shall be specified on the bonds.

9. The interest of the bonds of this loan shall be paid in the 6th and the 12th months.

10. Within the first five years only interest shall be paid, after which, *i.e.*, within the period of 30 years, redemption of the bonds shall be made by the drawing of lots. The amount of redemption shall be published beforehand in the Government Gazette by the Minister of Finance.

11. The security of the loan shall be the Stamp Tax and the tax on Title Deeds.

12. The raising of this loan, and the payment of interest and principal shall be managed by the Bank of China and its Agents.

13. From the date of redemption of the bonds and the payment of the interest, these bonds and the coupons may be used for the payment of taxes and other official payments.

14. This loan may be considered as security for the gold reserve of any Bank.

15. The bonds may be transferable or be mortgaged, and may be used as security, when such be required in any official service.

16. Detailed regulations of this loan shall be fixed by the order of the Minister of Finance.

LIGHT AND POWER

Wuchang Electric Light-Plant.—Negotiations for the lighting of Wuchang city have now been completed A stock company with exclusively Chinese capital has been formed, the Government has become interested in the exploit and has contributed land and buildings. The whole contract for the erection of a complete power station has been given to Messrs. Siemens China Electrical Co. The land and buildings of the Industrial School, near the Lotus Pond and the Emperor's Temple in Wuchang, have been the contribution to the new company as a site for the power house. The contract for the electric light station provides only for the taking over of the completed works, and gives the foreign firm a free hand in the order of machinery, passing plans for the new building and general erection. The intention of the company is to show, that it is possible for a Chinese firm equipped on the most modern lines, and run entirely under Chinese supervision to show a satisfactory balance sheet. In order not to run up too much expense at the start the plant at first will be small, consisting of two 400 horse power engines and Siemens dynamos, but provision will be made for later extensions, principally in the installing of steam turbines. The current will be carried through a three phase transformer, and then to the consumers by a network of overhead wires. The station itself will be one of the most up to date in the East, the constructors profiting by the mistakes of older enterprises.

A notable feature of the new company is that the promoters promise to issue a statement year by year of the running expenses and profits. The latter, although at first not expected to be large, are yet expected to be satisfactory, for it is thought that a number of the factories in Wuchang will contract for electric lighting and power.

Japanese Electric Plants.—According to a recent report issued by the Japanese Department of Communications, the number of electric works at present is 1,391, which shows an increase of 318 (about 30 per cent.) compared with that of the previous year. The total amount of capital is yen 462,119,027 of which yen 144,985,446 is invested in works not yet in operation, showing an increase of 32 per cent. in comparison with that of the previous year.

The rate of profits per capital paid in during the year 1911 was as follows:—

	%
Those supplying electricity	12
Electric railways	8
Those supplying electricity and running railways at the same time	4

With respect to the average receipts and expenditure of different kinds of electrical undertakings, we find that in those supplying electricity the expenditures amount to yen 67 against the receipt of yen 100, or 4 sen business expense of 1 kilowat supplied at 6.2 sen. This shows an average rate of dividend of 0.7%

Hydro-Electric Plant for Bulacan.—The Angat river in the province of Bulacan of Norzagaray, is to be harnessed for the purpose of development of electric power, if the application of E. B. Bruce, general attorney for the Manila Electric Railroad and Light Co. and the Philippine Railway Co. is granted. It means cheap light and power for Manila.

Mr. Bruce has applied to the insular government for certain water rights on the Angat river involving the use of 2,000,000 liters of water per second of time by diversion and return to the original source of supply below the power plant contemplated. This is the maximun flow of the river as estimated at the point where the dam will be located in the municipality of Norzagaray. The works to be installed at this point will consist of a storage dam, a power dam with sluices, penstocks, and power house with equipment and another power house, all three dams being a part of one storage system. The water is to be restored immediately below the works. It is proposed to develop 1,000 h. p. as a minimum with an increase to the maximum of power available which means ultimately at least 2,500 h.p. available at mean low water. This power plant site is situated about sixty miles from Manila and is believed adapted to the furnishing power for Manila and all the towns along the mainline. It will be one of the largest hydro-electric power plants so far proposed in the islands and means the investment of several million dollars and cheap light and power, not only for Manila but for the provincial towns in central Luzon.

Japanese Railway Board Plant.—The electric tram service on the Yamanote (suburban line of the Japanese Railway Board, which runs between Gofukubashi and Uyeno *via* Shinagawa and Shinjuku, is operated at present with electricity (2,000 H. P.) supplied by the Municipal Electric Bureau, the shortage being supplied by the Kashiwagi power station, formerly of the Kobu Railway, which was purchased by the Railway Board in 1906. On the completion of the Central Station at Marunouchi, construction of which is making headway, the Railway Board will replace the present steam train service on the Shimbashi-Yokohama and other short distance lines with electric trams. In view of the increase of demand for electricity with the change, the Railway Board started in October, 1911; the construction of a power-house at Komukai on the Kanagawa side of the River Tama, near the Yaguchi ferry, and about a mile South of the Kamata Station. The factory has been already completed and men are now engaged in the planting of four dynamos each with a capacity of 1,500 kilowatts. The factory is expected to be in working order by the end of this year.

WATERWORKS

Irrigation Works at Porac.—Victoria Singian as administratrix of several estates proposes to divert the waters of the Afge river, a small stream fed by springs in the barrio of Maliunlu municipality of Porac, Pampanga. The point of diversion is about three kilometers from Maniband and the amount proposed diverted is 125 liters per second of time in the dry season and 770 liters in the wet season. The work proposed will consist of a dam 5.75 meters high, 4.3 meters wide provided with two steel gates of 2 × 2.75 meters each, the banks of the stream to be protected by a wall of reinforced concrete about 5.75 meters high and one meter in thickness. The purpose of the plant proposed is to irrigate an area of 2,375,755 square meters of agricultural land.

Tientsin Waterworks Co, Ltd.—The annual general meeting of the shareholders in the Tientsin Water Works Co. Ltd., was held in the offices of the Secretaries, Messrs. Wm. Forbes and Co., on February 14. The Balance Sheet and Statement of Accounts was passed, and a final dividend of 5 per cent. was declared, thus making a total dividend of 9 per cent. for the year.

Tokyo Water Works.—According to the Tokyo Municipal Authorities, the water works revenue for the 2nd year of Taisho (1912) is estimated at 2,174,342 *yen*, which is a decided increase over the figures recorded for the last five years, as shown in the following table:—

Fiscal Year.	Water Works Revenue. *Yen.*
1909	1,401,579
1910	1,464,644
1911	2,122,038
1912	2,041,140
1913	2,174,342

Expenditure has also increased annually, the estimated figures for 1912 being 1,027,865 *yen* as against 834,661 *yen* last year. A satisfactory feature of the annual waterworks budget is that owing to the constant excess of income over expenditure the surplus passed every year into the reserve fund shows an increase, as will be seen by the following table:—

Fiscal year.	Surplus. Yen.
1909	397,555
1910	324,006
1911	365,000
1912	556,993

In view of this the authorities are said to be contemplating a reduction in the water rates at an early opportunity.

IRON AND STEEL

Wakamatsu Iron Foundry.—The Japanese Government, as Mr. Wakatsuki, Minister of Finance, announced in a recent speech in the House of Representatives, intends to transfer some of the Government works to private management one by one. It is already reported that the Wakamatsu Iron Foundry will be converted into a joint enterprise of the Government and the people in the form of a joint stock corporation. Baron Iwasaki is said to be much interested in this change of the system for the said iron foundry.

MINING

Penchihu Colliery.—The Penchihu Colliery & Mining Co. hopes to put out about 250,000 tons during the current year, as compared with about 160,000 tons last year. Of this output, about 100,000 tons have been contracted for by Imperial Japanese Navy and the Edamitsu Steel Works. The remainder is to be disposed of in Chosen and South and North Manchuria, including a considerable quantity for self-consumption. In Chosen, the steel works under the management of the Mitsubishi & Co. are said to prefer Penchihu Coal to the output of the Takashima Colliery owned by the Company. Then, the Naval Briquette Factory at Pingyang has a plan of extension under weigh, and when this plan matures the present demand from this direction will also increase.

Work on the new screening plant is expected to be finished about April. The new plant is of a temporary nature, with a screening capacity for about 130,000 tons per annum. It is to be replaced about two years hence by another one of a permanent character which will be equipped with a working capacity of about three times as much.

The Matsushima Colliery.—The Matsushima colliery, on an island of that name off the coast between Nagasaki and Sasebo, Nagasaki Prefecture, is one of the important and promising coal mines in Kyushu. Its output is at present 25,000 tons a month, but when the extension work, now in progress, is completed the production will be increased to over 500,000 tons. According to a Nagasaki paper, the ownership of this colliery, which was hitherto in the Koga family of Nagasaki, has been transferred to a limited liability company with a paid-up capital of 2,000,000 yen, known as the Matsushima Mining Company. Forty per cent. of the stock is held by the former owner Mr. Koga and the remainder by the Mitsui Bussan Company. Mr. Kaison, former manager of the colliery, according to the report, continues as Managing Director of the Mining Company, Mr. Ogita, manager of the Nagasaki branch of the Mitsui Bussan Company, acting as one of the Directors. At the same time it is announced that the coal from the Company's colliery will be sold by the Mitsui Bussan Company, which is the sole agent of its products, and that all contracts made by the former owner will be succeeded to and completed by the new company.

Gold Mines of Chosen.—The gold mines at Suian and Unsan, Chosen, are being worked by the American Mining Development Co. The yearly production of the Suian mine is about 1,000,000 yen, while the Unsan gold mine annually yields some 3,000,000 yen gold. These two mines are the principal gold mines conducted by foreign concerns in Chosen. Besides these, there is a gold mine at Chyansong, which has been recently purchased by a London firm and is now conducted under the management of French experts, the mining districts extending for 1,600 square *li*. This mine is, however, still in the course of experimental digging. The Kapson copper mine at Hamnan, belonging to the American Mining Development Co., and the Huchyong copper mine owned by the Italian Mining Co., are also in an experimental stage. Applications for gold mines and for gold-dust mining are occasionally sent in by foreigners, but they are all on a small scale.

The Furukawa Mining Company, obtained in October last official permission to work gold mines at Chyonmamyon and Nokoli, in Kusong district, North Pyongan province. Work on these mines has been begun by the company, employing some twenty Japanese and about two hundred Korean miners. The experimental stage of the work will be, according to Mr. Iijima, who supervises the work as chief expert, three years, and the cost is estimated at 500,000 yen. If the mines prove unprofitable, work will then be discontinued. In the course of the period during which trial work is going on, assaying and refining of ores gathered, in addition to examination of their amount and quality, will be steadily pursued. It is considered that the Korean method of refining ores by water power will also be tried, and official permission for it has already been obtained.

Amakusa Collieries.—Amakusa Island, South-western Kyushu, has long been known for its production of anthracite coal but the field has not been properly worked. The Daito Kogyo Kaisha, a Tokyo mining company, has a scheme for the development of the Shiki collieries, which are on the island, and to put it into effect will increase its capital by a million yen. The daily output of the collieries at present is 250 tons, but it is believed that it can be raised to 1,000 tons as the field is most extensive. The seams run under the sea for a great distance and the pits are only three miles from the port of Tomioka, a light railway making connection.

F.M.S. Tin Output in 1912*

	1912. Pikuls.§	1911. Pikuls.§	1910. Pikuls.§	1909. Pikuls.§	1908. Pikuls.§
January	67,566	64,333	66,277	73,612	92,983
February	72,545	53,147	64,199	46,352	62,831
March	53,698	50,132	46,850	61,100	66,402
April	67,270	54,568	60,020	65 126	62,495
May	71,849	62,868	61,935	63,131	61,632
June	59,465	64,202	62,180	75,899	67,739
July	71,175	63,799	65,350	68,627	76,708
August	74,831	68,592	70,639	73,560	70,083
September	69 133	62,862	56,324	68,827	64,804
October	65,605	68,764	60,444	68,316	76,082
November	63,386†	66,331	61,771	73,190	74,848
December	65,476†	62,091	60,909	81,156	77,412
Totals	801,999	711,698‡	736,898‡	818,887‡	854,064‡

*The figures show the monthly exports of tin and tin ore (the latter being stated at its assumed metal content) upon which duty is paid to the F.M.S. Government.

† Exclusive of Pahang, &c.

‡ Finally revised figures.

§ 1 ton (2,240 lbs.) = 16.8 pikuls.

Copper Mine at Changchun.—A newly-established copper mining company in Huatien-hsien, in Changchun, is about to conclude a contract with the Mitsui Bussan Kaisha at Changchun for a supply of 500,000 catties of copper. It is calculated that the mine will yield more than ten million catties of copper every month and the copper ore is said to be of excellent quality.

SHIPBUILDING

The Taikoo Dock Yards.—The frame of a new vessel is being laid down as rapidly as possible at the Taikoo Dock Yards for the Customs Department of the Philippine Government. Her length will be 165 feet over all, with a moulded breadth of 25 feet, and a moulded draught of 15 feet 6 inches. She will be equipped with a set of triple expansion engines, and two unusually large boilers of the regular marine type, which will give an indicated Horse Power of 1,400. The vessel will be equipped with a four bladed propeller, (bronze), and sixteen knots speed is called for in the contract. The vessel will be used by the U. S. Philippine Customs in making fast trips among the islands as a preventative against smuggling of opium, Chinese and contraband in general. It is expected that the vessel will be finished in about seven months.

Osaka Iron Works.—The Osaka Shosen Kaisha has placed with the Osaka Iron Works orders for three freight steamers, each of 5,000 tons loading capacity, for use on the Formosa line.

SUGAR

Sugar Mill for Panay.—The first modern sugar mill for the island of Panay has just been purchased by José Zulueta, a wealthy Filipino *hacendero* of Iloilo, from the Honolulu Iron Works, through their local agents, the Pacific Commercial Company for in round figures, P. 175,000. The mill is to be delivered within seven months from date of purchase and will be ready to grind when the next crushing season begins. Its location will be Tigbauan, a town situated on the main thoroughfare of Penay and twenty miles distant from Iloilo from which city it is easily accessible by automobile. The capacity of the mill will be 150 tons of cane per day of 24 hours, and it is guaranteed to manufacture from the sucrose of the cane crystallizable sugar of 96° polarization. The mill is absolutely complete and modern in every respect, with steel buildings designed to withstand a wind velocity of 100 miles per hour. The purchase price includes the installation of an electric light plant and a telephone system. A representative of the Honolulu Iron Works will soon arrive with the plans of the structure and the foundation bolts, and the work of construction on the foundations will be begun as soon as he comes.

New Mill for Negros.—The De La Rama family are establishing a new P. 400,000 sugar mill as a central for their seven haciendas at Bago in southern Negros, P. I. The new mill will be completed and ready for crushing in about six months. The De La Rama central will be the second largest in the Philippines and the largest in Negros. The seven haciendas, where the mill is to installed, produce on an average of 70,000 piculs of sugar annually.

Beet in Korea.—Two rival companies which were striving to obtain sanction to engage in beet sugar manufacture in Korea have adopted the advice of the Government-General and have amalgamated official sanction will shortly be given to the new company to begin operations.

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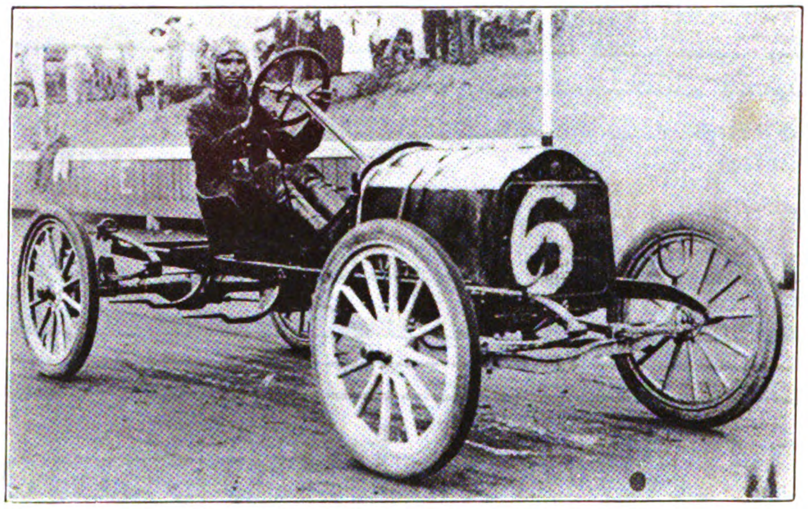

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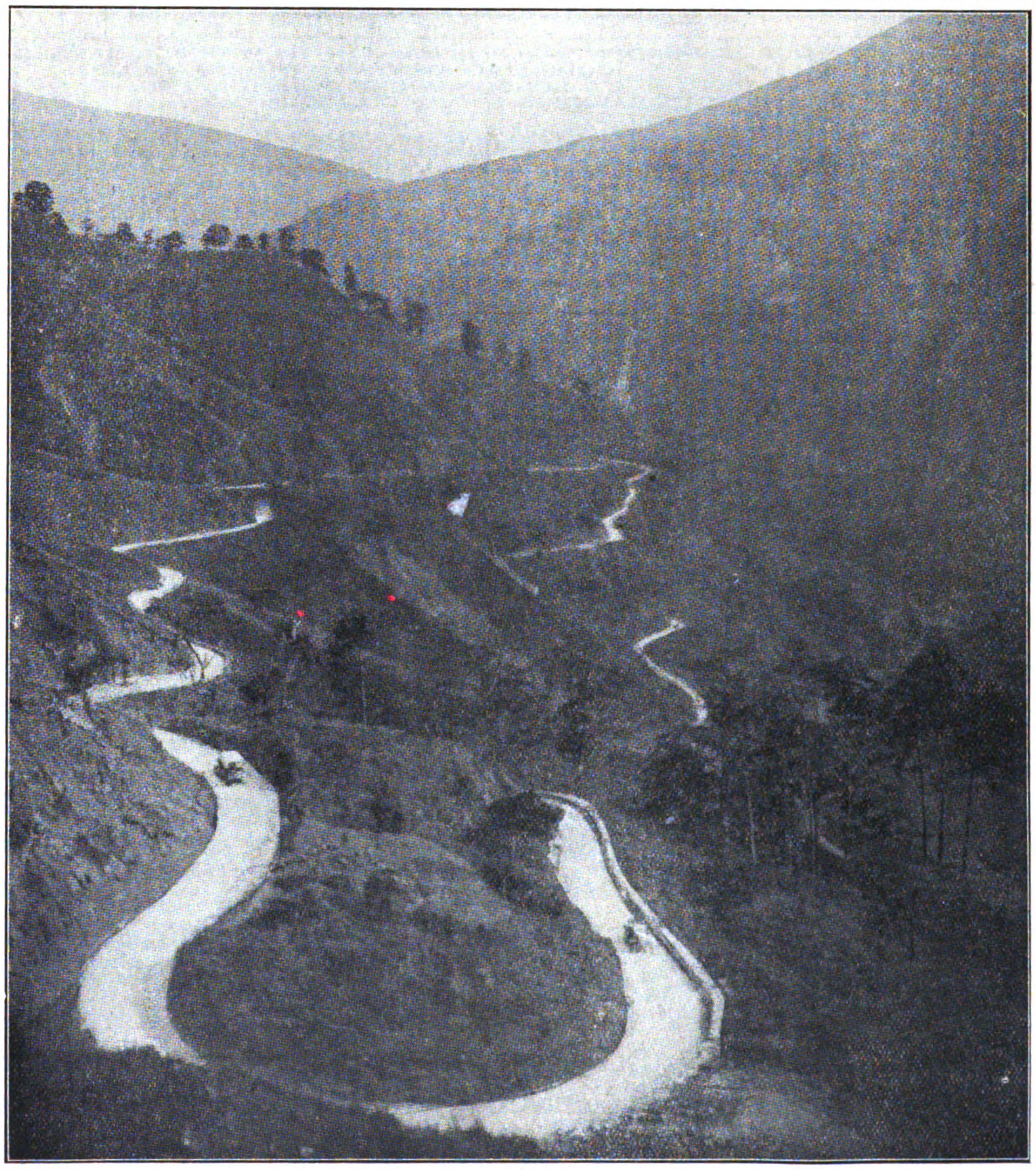

THE ZIGZAG ON THE BENGUET ROAD

The road at this point climbs 258 meters (845 feet) in a distance of 3,200 metres. The photograph shows the regular daily train of motor trucks en route to Baguio. The trucks carry freight and there is also a passenger service. Both the passenger and freight services are operated by the Bureau of Public Works

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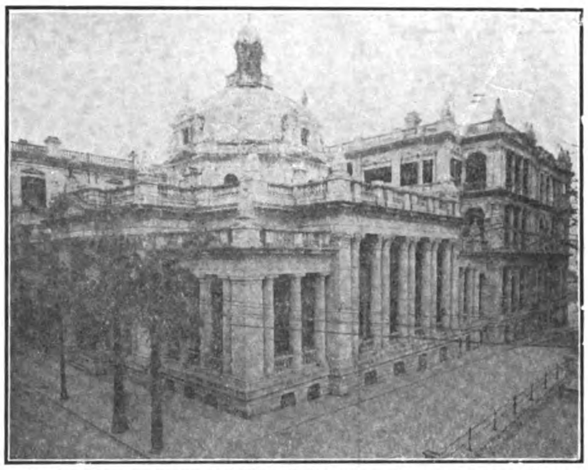

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, MARCH, 1913 No. 10

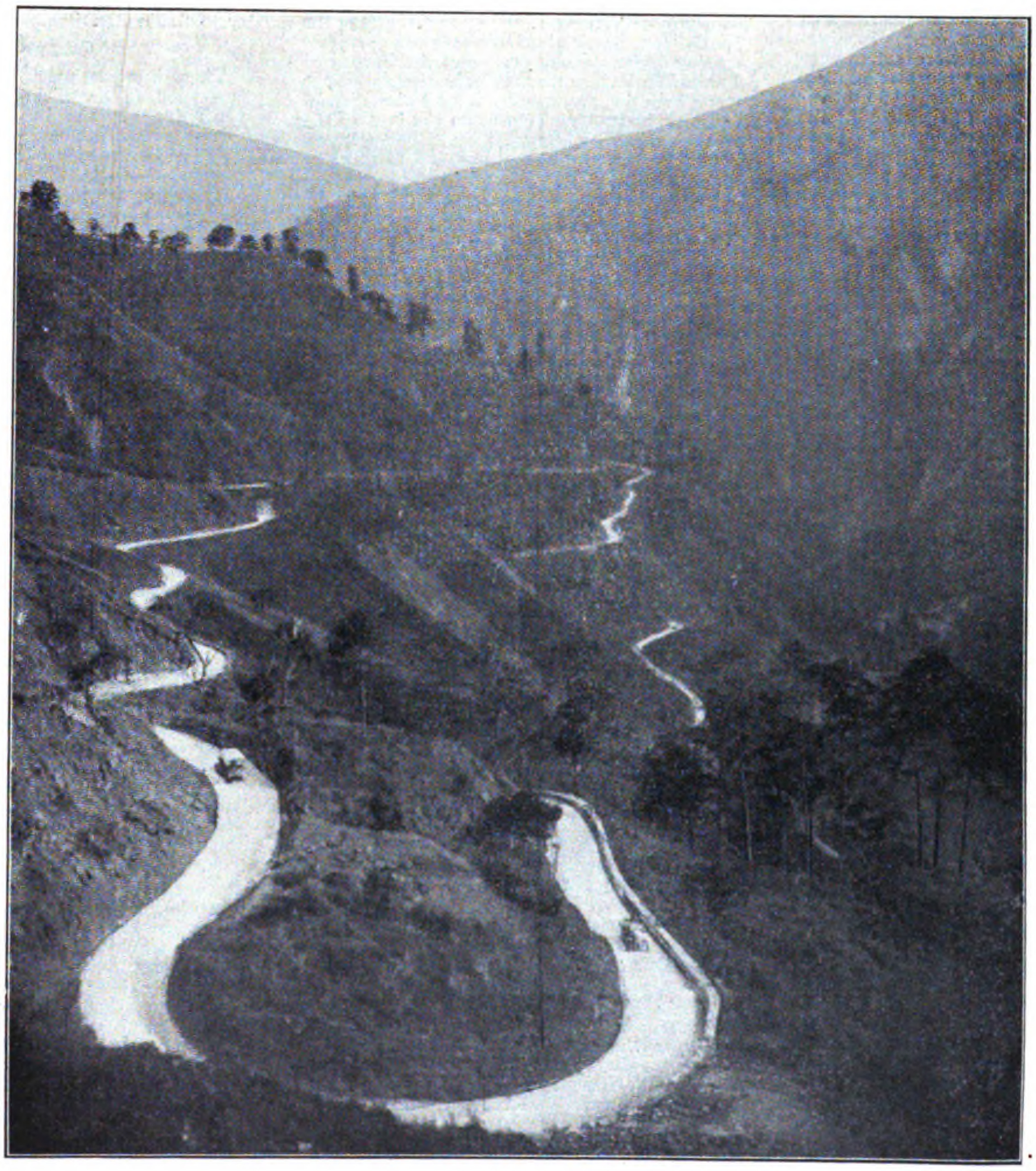
PUBLIC WORKS IN THE PHILIPPINES

A RECORD OF MAGNIFICENT PROGRESS

It is when a study is made of the reports of the officials of the Philippine Government whose main mission in life is to "do things" that a dim realization is gained of what the American occupation has meant to the Filipinos. Politics do not enter into consideration. Democrat or Republican, when a man sees before him a plain and unvarnished statement of work done, he can only, if he be honourable and fairminded, appraise the value of the work by the results shown. Applying this test to the work of the Insular Director of Public Works, Mr. Warwick Greene, and his associates, it must surely be said that here is another brilliant testimonial to the splendid capacity of the men to whom the work of regenerating the Philippines has been entrusted. Whatever may be the future of the Islands we confess, for our own part, that we feel every time that we are privileged to place on permanent record another testimony to the success of one or other of the departments of the Insular Government, that it would be little less than a crime to interrupt the work that is being done. The benefits of the American occupation have been scored upon the face of the land. Those who prognosticate about the future are usually regardless of their reputation and of these we are not. But we will go this far: we believe that much of the empty political talk of which so much has been heard of late will soon be forgotten and that the labours in the cause of civilization that have engaged so much of the brain and muscle of Americans will continue until the goal is reached. That goal is the permanent establishment in the Islands of the advantages that accrue from settled conditions and a high ideal. The former has practically been secured, an exemplar of the latter is always being given.

It has been our policy in the past to allow these reports to speak for themselves. As records they must stand or fall by the results they show, and, happily, they can sustain the test. We, therefore, now give extracts in some instances condensed, from the report of Mr. Warwick Greene to the Secretary of Commerce and Police, and let them tell their own story:—

Mr. Warwick Greene continued as Director throughout the year, with Mr. Clarence W.



THE ZIGZAG ON THE BENGUET ROAD

The road at this point climbs 258 meters (845 feet) in a distance of 3,200 metres. The photograph shows the regular daily train of motor trucks en route to Baguio. The trucks carry freight and there is also a passenger service. Both the passenger and freight services are operated by the Bureau of Public Works

Hubbell in the position of chief engineer. Mr. Willard L. Gorton on June 1, 1912, was appointed chief irrigation engineer, in place of Mr. Clarence G. Wrentmore, transferred. Mr. Claude Lindsey continued in the position of assistant to the Director.

PERSONNEL

The number of individual engineers employed during the year was 141 as against 155 for the year before. The number of American employees in the Bureau decreased 2 per cent., while the Filipinos increased 11 per cent.

On June 30, 1912, there were employed—

Americans	553
Filipinos	1,029
Total	1,582

IMPROVEMENT IN ADMINISTRATIVE METHODS

Four radical and successful reforms have been made in the administrative methods of the Bureau during the last year and a half. They are:—

1. *A district engineer for each province.*—The individual province is now the engineering unit of the Bureau. Formerly the district comprised several provinces under a district engineer who had his headquarters at one of the provincial capitols. This arrangement was unsatisfactory. The supervision of the district engineer was spread too thin and too much of his time was wasted in traveling. Furthermore, the smaller provinces were apt to consider that the district engineer neglected them in favor of the larger provinces, who on their part were always impatient of the time that he spent with the smaller and less important ones. To remedy this condition, 31 districts were established, corresponding to the 31 provinces. Each district engineer is identified now with one province only, and the engineering work of each province has a single responsible head, who is at all times in close touch with the provincial board, and who is personally as much concerned with the welfare of the province as any provincial official. This has proved most successful in practice.

It may be pointed out that the work of the district engineers is supervised by the division engineers, of whom there are five for the Islands, each in charge of a division composed of from five to ten provinces. They have headquarters in Manila, but the greater part of their time is spent inspecting the work that is being executed in the provinces. They are the representatives of the Director in the field, and they serve to bridge the gap between the office men and the field men, and between the central office in Manila and the district or local offices. They quickly bring local needs and conditions to the attention of the head offices of the Bureau in Manila, and at the same time they see that the proper authority of the central office over the local offices is promptly and directly exercised, and that looseness and lack of discipline are prevented. Through this organization it is also possible to enforce uniform and properly approved standards of construction in engineering.

2. *The substitution of fixed surcharges for the proration of general expenses.*—It often appears to be not generally understood that the Bureau of Public Works is organized almost wholly upon a self-supporting basis. The annual appropriation for the Bureau is only P.286,000, and, while this is augmented by certain transfers, the account in actual practice is so offset by expenses of maintaining Insular buildings and equipment and minor other expenses, that only about P.50,000 remains. Almost the entire expense of administration together with the cost of permanent improvements and equipment not otherwise provided for is therefore met by surcharges assessed upon projects supervised by the Bureau.

This expense includes all the general expenses of the central office in Manila, including property, records, and other work of that office. Formerly the general expense—that is, the expense which could not be charged direct to any given project—was prorated among all projects by a complicated system of accounting. The long delays in rendering accounts, the uncertainty of knowing what the general expense would come to in any given case, and other matters not necessary to mention in detail, soon showed that this system was not practical. Accordingly, on the recommendation of the Director of Public Works, and with the concurrence of the Auditor's Office and the Executive Bureau, the system was changed and the present one adopted, whereby surcharges of 8, 7, and 6 per cent. of the total cost of each project are paid to the Bureau to cover the general expenses of the same, which, as pointed out above, are not appropriated for. The surcharges are regulated according to the services performed by the Bureau. At the present time they include all the expenses of the central office, including the division engineer's organization, and the cost of designing and of the preparation of plans and specifications. During the past year this surcharge did not always include the cost of the preparation of plans and specifications, but during the coming year it is intended that it shall, as the growing efficiency of the Bureau is enabling it to operate more economically, and the surcharges should be sufficient to cover cost of designing, except in special cases.

3. *Prevention of overdrafts by the keeping of ledger accounts.*—Prior to January 1, 1912, the district engineers and others in charge of construction relied on the offices disbursing the funds for financial statements on projects coming under the supervision of the Bureau of Public Works. In the provinces, these accounts were kept by the treasurer, and the district engineer had no real check on the cost of the work during its progress, as the treasurer's books were never sufficiently up to date to give him the necessary information. This has not been the fault of the treasurers, as only the man directly in charge of a project is in position to keep its cost accounting up to date. Under the former system, overdrafts were very frequent, as indicated by the fact that in spite of strenuous efforts by the Bureau during the calendar year 1911, it was found that on January 1, 1912, 24 of the 31 existing provinces showed an overdraft on one or more projects. That meant that in almost all the provinces there existed projects where the cost of the work and the obligations assumed therefor exceeded the amount of money available for the same, and that the funds had been overdrawn before any of the proper officials had been notified and additional funds secured or the work shut down. For this result the Bureau was almost wholly blamed, although under the system it was practically powerless to prevent the same. To overcome this condition of affairs, an accounting ledger, was inaugurated in all the engineering districts. On this form the district engineer enters all certified expenditures and all obligations in detail as they occur. This method of accounting has increased the office work of the district engineer to some extent, which, however, has been more than justified through the results obtained. Since the inauguration of this system, the number of provinces reporting an overdraft has been reduced from 24 to 9, and in these provinces such overdrafts had been incurred prior to the inauguration of the present district accounting system.

Since the inauguration of this system, except where the obligation has been incurred prior to this time, no overdraft has resulted on any one project within the 31 Christian provinces. This system is being extended to every office of the Bureau which is in charge of construction work.

4. *The Director of Public Works resumes his responsibility for the engineering design and for the proper construction of public buildings.*—In February, 1910, an agreement between the former Director of Public Works and the Consulting Architect, approved by the Secretary of Commerce and Police, was entered into, whereby the Consulting Architect assumed the direction not only of the design of building, but also of the engineering details and of actual construction. Under this system all engineers, foremen, inspectors, and others employed in the design and construction of public buildings reported directly to the Architect, although carried on the Bureau of Public Works pay rolls. From that time the Director of Public Works ceased to assume any responsibility for building construction work (except schools and some small buildings). This arrangement was both inconsistent with the law and unsatisfactory in practice, and, after urgent recommendation from the present Director, was finally changed on June 8, 1912. Since that time the Architect prepares this design of buildings, but the same are checked by the division of engineering design of the Bureau, to see if the engineering and structural design is sound, while the work is actually executed by the several construction divisions of the Bureau. The Architect is responsible for the convenience and appearance of public buildings and for their appropriateness to the use for which they are designed; the Director of Public Works for the soundness of the engineering and structural design and for the proper construction of the same.

The four changes outlined have greatly facilitated the work of the Bureau and have increased its efficiency. The greatest handicaps for the Bureau at present are (1) the confusion in its property affairs, which is largely a legacy from past years and which is rapidly being improved by the efforts of the Auditor's Office, and (2) the lack of an accounting system suited to the needs of the Bureau.

COST OF WORK

There has been much comment and criticism is regard to the alleged "high cost" of the work done by the Bureau. Considerable of this criticism is loose and irresponsible, and may be disregarded. Some of it, however, is founded on facts. The cost of work has been increased by the following causes:

1. *Work too much scattered and too many small projects.*—The work of the Bureau is carried on in 31 provinces and in Baguio, which, with the building work that is done in Manila, really makes 33 engineering districts. This distributes the energy of the Bureau over a very large area, and in view of the comparatively limited funds available for public works necessarily increases the cost of construction. This condition is fundamental, however, and cannot be changed. The development of public works cannot be limited to certain portions of the Islands only, but must necessarily be developed over all portions that are at all thickly populated. But also it is believed that the work has been scattered to an extent greater than justified. If in each province the work had been more concentrated, there is no doubt but that the construction of public works would have been more economical. The waste of energy of the district engineers that results from isolated road projects can hardly be over-emphasized. The construction of school buildings and bridges in out-of-the-way places makes it almost impossible for the district engineer to exercise proper supervision over the construction of the same. In too many cases the supervision must be left almost entirely to foremen who are not fully qualified for the work in hand. The Bureau of Public Works should not be blamed for the increased cost of public works that is brought about in this way.

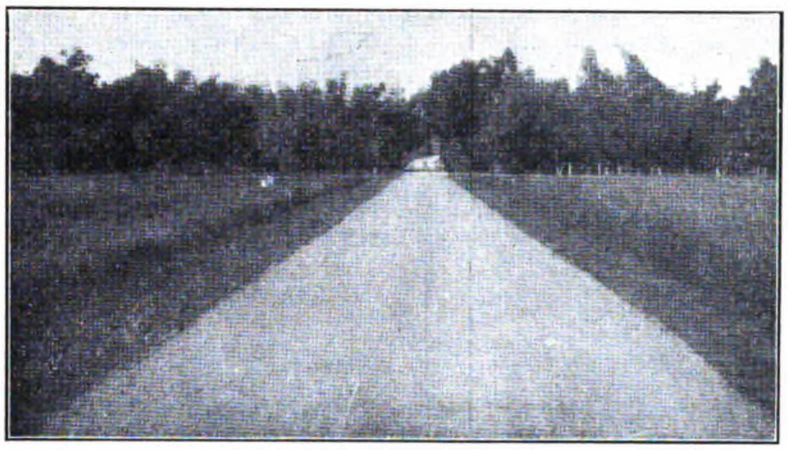
2. *Uncertainty of income.*—The Philippine Government, owing to the failure of Congress to authorize the necessary bond issue for some years has been constructing its public works almost wholly from current revenue. Each year, therefore, it has been possible to appropriate only the surplus remaining after current expenditures had been provided for. As the revenue of government necessarily varies from year to year, this method has left the Bureau of Public Works in uncertainty as to the amount which would actually be available for expenditure from Insular sources. Doubt existed even after the permanent improvements appropriations have been made because of the proviso that they were subject to release by the Governor-General. These appropriations, in accordance with the intent of this provision, have been released only after it was fully assured that the revenues would provide

A ROADMAN AND HIS TOOLS

A view of the coastal road between Tacloban and Palo in Leyte Province. The road was reconstructed some eight years ago. This kilometer has been maintained for three years at an average cost of P985.04 per year, which figure includes extensive resurfacing with broken stone. This is not far from double the average for all the Islands. The roadman is shown with his badge and stripes for four years' service. His stone hammer, rake, and other tools are to the right, while the supply of broken stone is in the bin just outside of the ditch on far side of the house.

ample funds. As a consequence the Bureau is kept in doubt from year to year and from month to month in any given year as to the exact funds that will be available for expenditure. It results that at times the organization of the Bureau is too large for work in hand, and at other times the work crowds on the Bureau too fast and the organization is too small to handle it to advantage.

Often, too, the Bureau is comparatively idle during part of the dry season when work can be most economically carried on: later, funds are made available and strong pressure is brought to bear on the Bureau to start work at once, with the consequence that construction is often prolonged into the rainy season, and as a result the cost is increased. To enable this Bureau to carry on work more economically, it is essential that a bond issue be authorized, the expenditure of whose proceeds shall be distributed more or less uniformly over a period of years. Provided it has the assurance of a fixed income of this nature each year, the Bureau can so adjust its work as to take care of the fluctuations in funds from current revenue more economically than under the present condition.



AN OILED SECTION OF THE MANILA-SOUTH ROAD

The main trunk road running south from Manila has been treated at two separate points with heavy oil; the alternate sections being left untreated to determine the value of oiling under Philippine conditions. The surfacing is two-course work with screenings on top rolled in place. The oiling cost P.852.40 per kilometer ($685.89 per mile). The construction at this point was complete in June, 1912, three months before this photograph was taken.

3. *Climatic conditions.*—The violent storms and extraordinary rainfall of these Islands, as well as the unstable formation of its hilly and mountainous country, make washouts and other damages of frequent occurrence, naturally to the increased cost of public works.

4. *Difficulties and uncertainties of transportation.*—These contribute, very considerably to the increased cost of work.

5. *High cost of supervision.*—For many years the supervision will necessarily be higher than in the United States. Our labor is untrained to a large degree, even for the simplest public works task and needs more supervision than in the United States.

Furthermore we must compete with engineering salaries paid in the United States, where we secure most of our engineering personnel, there being practically none in the Islands; and we must offer more than the prevailing salaries in that country as an inducement to leave home and enter service in the Tropics. The supply of trained Filipino engineers is very limited, owing to the apparent preference of the Filipinos for legal and medical rather than engineering careers. Our limited trained Filipino personnel, however, is used to the utmost, as shown by the fact that on June 30, 1912, Filipino engineers were in control of the work in four provinces, namely, Isabela, Zambales, Bataan, and Antique.

6. *Lack of assistance from the Auditor's Office in the past.*—There was a very rapid expansion of the Bureau in 1908 owing to the fact that large appropriations for public works were suddenly made available. The engineering personnel was expanded as rapidly as possible, but insufficient provision was made in the property and accounting division to take care of the enormous increase of work. The result was a confusion of property and other accounts. From November 18, 1908, until December, 1910, the accounting division was in direct charge of the Insular Auditor, and the latter, by executive direction, was making an effort to straighten out and systematize the accounts and the property affairs of the Bureau. Little progress had been made in this direction, however, up to the time of the suspension of the then Auditor, in November, 1910. In the meantime, the enormous volume of work done by the Bureau, superadded to the confusion already existing in the accounting affairs of the Bureau, produced a condition of affairs most detrimental to the operations and to the good name of the Bureau. The long delays in rendering bills for services performed, the confusion and errors when the bills were actually submitted, the impossibility of determining the status of the property of the Bureau, and other embarrassing results, all greatly increased the cost of operation of the Bureau with a consequent increase in the cost of public works.

In the interval pending the appointment of a new Auditor, the Bureau undertook as best it could to straighten out its own accounting and property affairs. Order was gradually evolved out of chaos in the accounts, and the accounting division is now conducting its affairs in a far more businesslike way than ever before, although we contend that a system of accounting more suitable to the needs of the Bureau should be put into effect.

7. *Inadequate Salaries.*—The salaries authorized for our engineers are in many cases too small to secure men competent for the work they are entrusted with. This is particularly true of isolated projects in the provinces where a thoroughly experienced engineer should be in charge of the work, but the salary authorized only permits us to employ a young and inexperienced man. We have endeavored to improve this condition through the constant inspection of the division engineers, who are our most experienced engineers, and in this way we have lessened the danger of a repetition of many of the mistakes of the past. We recognize that the same complaint in regard to inadequate salaries is raised by most of the Bureaus, and that this Bureau is perhaps no worse off than many others in this respect.

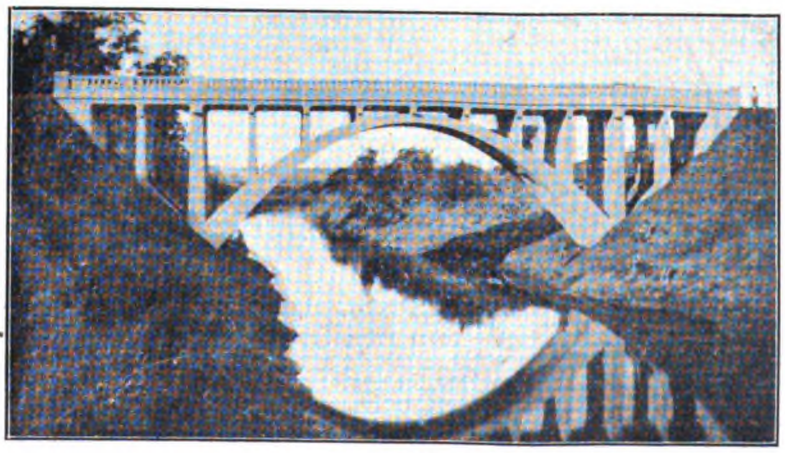
8. *Defects in the organization of the Bureau itself.*—All of the above causes of the high cost of public works are beyond the control of the Bureau. There remain those which are within its own control. Like all other organizations, we have suffered from incompetent personnel and from errors of judgment on the part of our responsible officials. We believe, however, that great progress has been made in the last three years in increasing the efficiency of the personnel, in discouraging a high-handed attitude on the part of our men toward local officials, raising our engineering and administrative standards, and in promoting a spirit of loyalty from its members toward the Bureau and its work.

SCOPE OF THE BUREAU

The work of the Bureau falls into five main classes: 1. Road and bridge work. 2. Building work. 3. Irrigation. 4. Artesian wells. 5. Miscellaneous.

ROADS AND BRIDGES

The policy of construction of bridges of durable materials inaugurated about five years ago has proved most satisfactory. Concrete bridges are the best adapted to the needs of this country, and should be installed as far as possible. In some cases, of course, steel



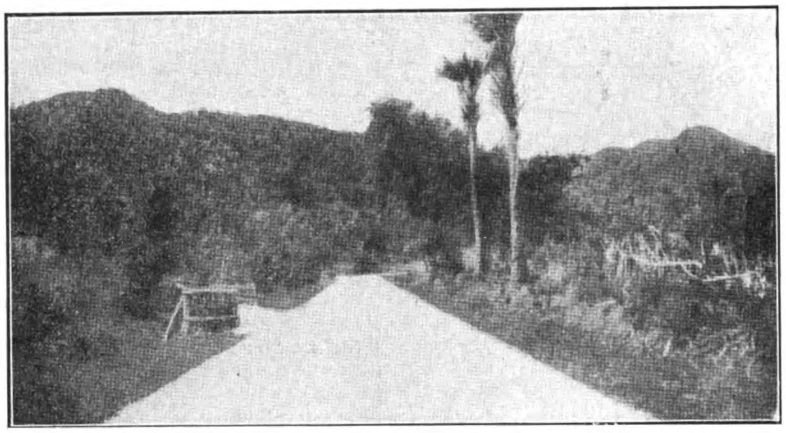
A MODERN REINFORCED-CONCRETE BRIDGE

This waterway is on the main road of Cagayan Province and traffic formerly crossed over on a bamboo raft The bridge was c mpleted in January, 1912, at a cost of P26,300. The span is 22 meters (72 feet) long, the roadway is 4.27 meters (14 feet) wide, and the floor of the bridge is 11.38 meters (37 feet) above the water at ordinary stages. The Bureau during the year added 17 per cent. to the number of concrete bridges and culverts in existence.

bridges are needed, and in a few cases (as for example, on the Benguet Road) wooden bridges are justified. In general, however, conditions favor the construction of concrete bridges and culverts, the maintenance cost of such structures is practically nothing, they are permanent assets of the Government and they do not deteriorate with time.

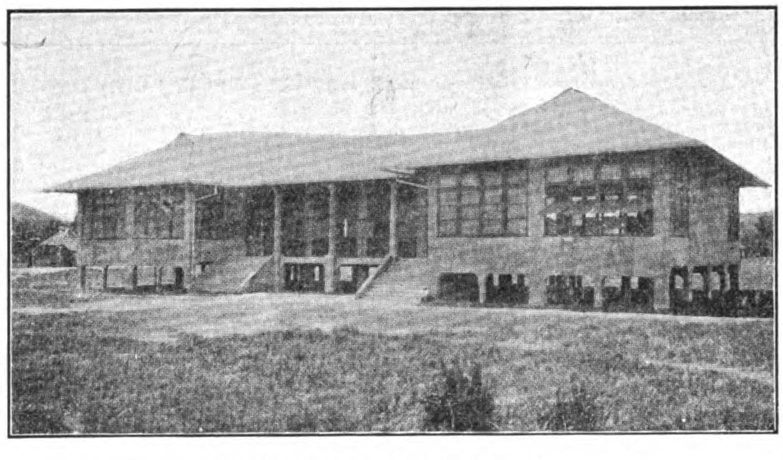
Roads

Steady progress has been made, and at times in the face of some opposition, in the construction of durable roads. The Bureau long since recognized that wherever there was much traffic, the construction of gravel or broken stone surfaced roads was essential, as other types of road almost invariably became impassable after their first rainy season. The construction of macadam roads, however, is handicapped somewhat by the inferior rock available in the Islands. Gravel taken from the river beds is generally abundant and cheap, and the greater part of our first-class roads are gravel surfaced, and up to a certain volume of traffic, are satisfactory. If the traffic increases beyond that point, however, the cost of maintenance is too high and stone-surfaced roads are more economical. We anticipate that as traffic increases in the future, it will become necessary to resurface many of these roads with 2 or 3 inches of broken rock. The expense of this will not be heavy, as the foundations of the road, structures, drainage, etc., are now complete and all that will be necessary will be a top dressing of more durable material than gravel. We also anticipate that the use of bituminous and oil-bound macadam roads will increase, particularly on roads where there is heavy automobile traffic and on sections subjected to annual overflows.



SANTIAGO-CANDON ROAD, ILOCOS SUR PROVINCE

This is a point of the Manila-North Road between Santiago and Candon in Ilocos Sur Province. The construction was completed in 1910. The section was then designated first class and the maintenance organized under the caminero system which permanently stations a roadman every one or two kilometers and provides him with a store of road-mending material. The cost of maintaining this road during the year averaged P262.70 per kilometer. The Bureau maintained nearly 2,000 kilometers of road by this system during the year.



A NEW PRIMARY SCHOOL

Each hamlet has its primary school. In addition to these, the township maintains a central primary school which may provide also for one or two secondary classes. The above photograph is of such a central school at Barili on the west coast of Cebu. It was completed on October 31, 1911, at a cost of P13,323.46 and will accommodate 300 pupils. Nine schools of this particular type and size were completed during the year, usually so located as to draw on a population of about 2,000.

We have now about 2,000 kilometers of hard-surfaced roads in the Islands (not including Manila and the Moro Province), on which the traffic is increasing at an amazing rate. We believe that these roads and the great facilities they have given to transportation of commodities have been one of the great factors in the very marked increased prosperity of the country in the last few years. On the great majority of roads that have been constructed, the traffic more than justifies the outlay for construction and for maintenance. The location of a few roads was poorly selected, however, from the economic point of view, and on them the traffic has not justified the cost of construction. Such roads are the Ormoc-Dolores Road, of Leyte, and the San Julian-Borongan Road on the east coast of Samar. This Bureau has made a special study of this subject and recommends its road projects from the productive point of view—that is, we endeavor to select only projects where the traffic will justify the cost of construction and maintenance. Our advice and recommendations are not always followed, although we believe that at the present time very few, if any, roads are being constructed that do not fully justify the expenditure of the tax-payers' money. In Samar we have taken the initiative in recommending that practically no first-class roads be built, but that the road and bridge money be spent in the construction of trails as far as possible along the location of future roads. We have done this because the population is so scattered, the province is so mountainous, and conditions are so primitive that the resulting traffic will not justify the expense of first-class roads for a long time to come. For that reason we believe that the construction of trails should first be proceeded with, eventually to be replaced by roads as the population increases and civilization develops. With the funds at our disposal, there is at present no other method of handling the road problem in so large and extensive a territory as Samar.

Trunk Roads.

The construction of two great trunk roads in Luzon has been quietly under way for some time. The first is the Manila-North Road, between Manila and Bangui, at almost the extreme northern end of Luzon. A considerable portion of this road is now constructed as first-class road, and many new sections will be added during the coming dry season. Practically every section of this road leads through a productive country, so productive that the local traffic alone would justify the construction. The completion of this road work as a great interprovincial project, with the construction of each local section as a link in a great chain, makes an appeal to public imagination which has materially aided in securing support for the same. The route through Nueva Ecija, in place of Pampanga and Tarlac, was adopted for the reason that the latter are served by a railroad, whereas the greater part of the eastern portion of the central plain of Luzon is not so served, and for that reason the construction of the Manila-North Road through Nueva Ecija is more than justified from an economic and military point of view, particularly as we have little doubt that the construction of the Manila-North Road will shortly be followed by the construction of another trunk road from Manila to Lingayen, through Pampanga and Tarlac. The Manila-North Road will pass through the Provinces of Rizal, Bulacan, Nueva Ecija, Pangasinan, Union, Ilocos Sur, and Ilocos Norte, and eventually will form a continuous highway from the city of Manila to the plaza in Bangui. It will be constructed in sections by a combination of Insular and provincial funds, and it is planned to make a first-class road from Manila to Laoag, and a second-class one from there on. The total distance will be about 595 kilometers, or 369 miles.

Manila-South Road

This road will eventually run from Manila to some point in the Province of Sorsogon, at the extreme south end of the Island, a distance of about 480 kilometers, or 300 miles. For some years to come, however, it will necessarily have to be considered as two sections—one from Manila to Gumaca, in Tayabas, and the other from Nueva Caceres, in Ambos Camarines, to Sorsogon. The construction of the road over the intervening mountains is a subject for the distant future, but one which we feel sure will eventually be undertaken. There is now a road from Manila to Gumaca, a distance of 208 kilometers (129 miles) open to wheeled traffic. This road has many poor sections, on some of which, however, reconstruction work is now in progress. There is already a through road from Nueva Caceres to Legaspi, in Albay, a distance of 104 kilometers (64.5 miles,) and the inferior sections of this road are now in process of reconstruction. Investigations are now under way in regard to the feasibility of an interprovincial road between the Provinces of Sorsogon and Albay.

Building Work

During the past year the Consulting Architect was almost wholly responsible for both the design and construction of building work, and his report should be consulted in regard thereto. However, a large number of school buildings were built under the direct supervision of the provincial division.

As already pointed out, at the present time this Bureau is again responsible for the engineering features and the actual construction of buildings.

Irrigation

Until recently this Bureau has had no reason to be proud of its record in irrigation work. The administration has been costly, and poor judgment has been shown in the selection and handling of personnel, in respect to relations with other divisions of this Bureau, as well as with other bureaus, and in the selection of projects. Furthermore, serious engineering errors were made in the construction of the San Miguel system, Tarlac, our first large irrigation project. The original estimate of this Bureau, submitted October 14, 1909, was P.300,000. This estimate was approved, the money was allotted, and the Government entered into a contract with the Tabacalera Company to construct the system for the company for that sum, the Government to be reimbursed as provided by law. In July, 1911, the dam, then nearing completion, was destroyed by a flood. The dam failed during an extraordinary flood, but before the peak of the flood. A searching investigation has shown that the dam was located at the wrong point, was inade-

quately designed, and probably would have failed in an ordinary flood. The blame for this was distributed over many individuals, and the present Director felt that the time had come for radical reform in the irrigation division, particularly when this failure was considered in connection with the otherwise unsatisfactory progress in irrigation work. Accordingly, extensive changes in the personnel of the irrigation division were made.

Under the direction of Mr. Gorton, an irrigation engineer well qualified by his experience in the United States for this work, the work of the division is now proceeding satisfactorily, and gives great promise for the future. A new dam of the Barrage type for the San Miguel system has been designed by Mr. Gorton, and is now under construction by contract. Final estimate on the project is P.1,084,560, this figure including the cost of the structure which failed. The actual money loss involved in the destruction of the first dam (including some damages to the canal system which occurred at the same time) is estimated at P.76,360. In spite of the loss of the dam, however, the distribution system has been in operation during the past dry season. Final estimate brings the cost of the system to P.271 per hectare, as compared with an average cost of P.250 per hectare in the United States. The original system was designed by young and inexperienced engineers of this Bureau, and their design was inadequate and their estimate too low. It was approved by older and more experienced engineers, both within the Bureau and without, who evidently did not investigate the matter or scrutinize the data personally. The work was carried on by the successors of the original irrigation engineers of the Bureau, and on them the greater part of the blame must rest, as they had time and opportunity to study the matter closely, were in a position to do so, and it was their duty to do so. At the present time, there is not in the service of the Bureau a single engineer who was directly responsible for the design or estimate for this system.

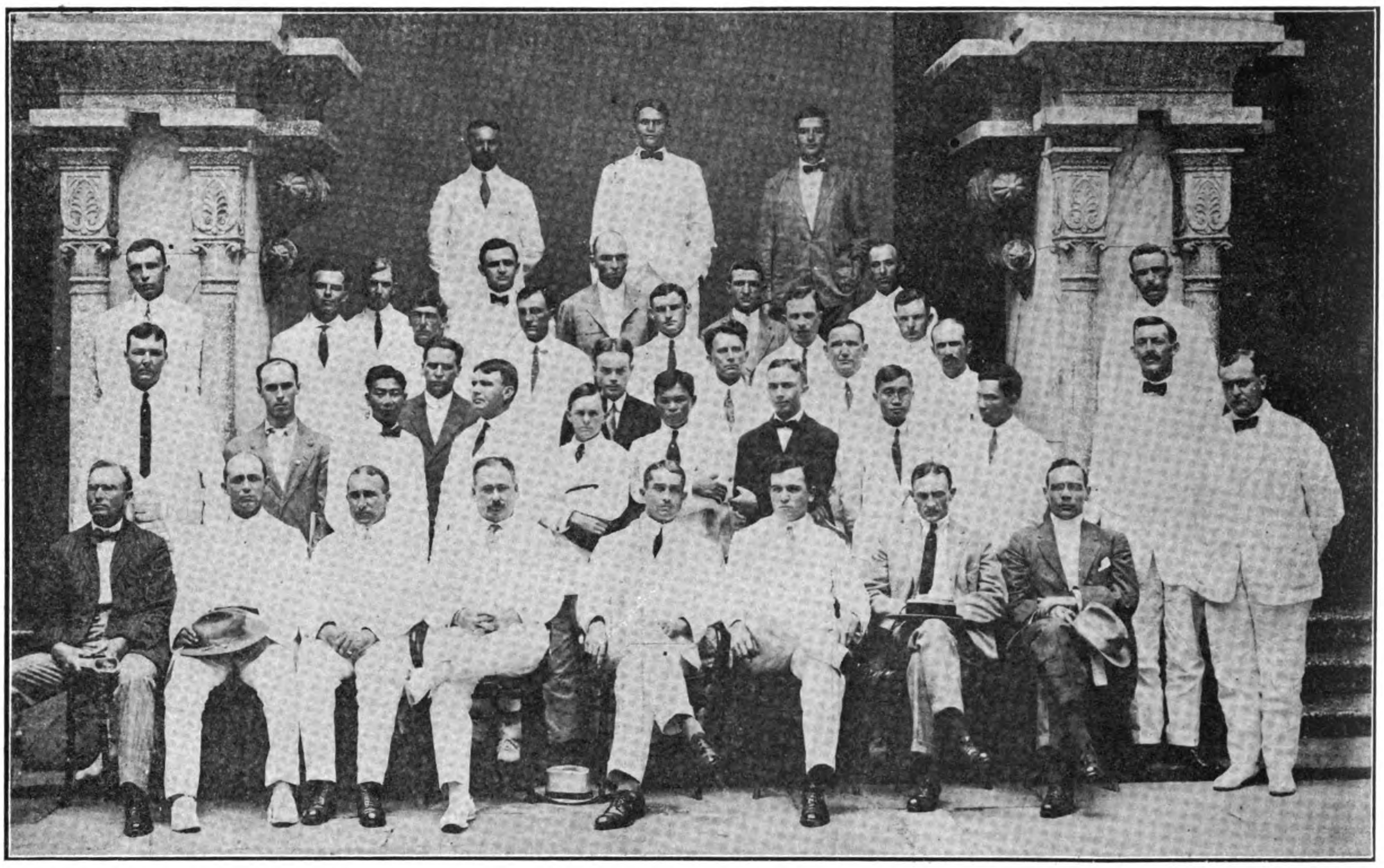
The project when completed will be a very fine one and should be a splendid object lesson of the advantages of irrigation by a modern system. The Bureau does not wish to conceal the fact, however, that the inexperience of its engineers caused a loss of P.76,000 and in many other ways embarrassed the Government. We may point out, however, that costly engineering mistakes attended the beginning of irrigation and hydroelectric development in the United States and elsewhere, and that from its first important irrigation project this Bureau has learned much that will be invaluable to it in the future. The lesson of those first mistakes will not soon be forgotten.

ARTESIAN WELL WORK

Splendid progress continues to be made in the drilling of artesian wells. This work for some years now has been economically and efficiently done, and with the minimum of friction with local officials. The deep-well rigs operated under the direction of this Bureau and the jet rigs—some operated under its direction and other provincial direction with some Insular aid—are supplying the more populous section of the Islands with good drinking water at a rapid rate, considering the funds available. There are now 684 successful artesian wells in the Islands.

MISCELLANEOUS

The most important project finished during the year under this heading was the Osmeña Water Works for the city of Cebu. This project was begun February 17, 1911, and



DISTRICT AND DIVISION ENGINEERS

This photograph of the district and division engineers was taken at a conference held in Manila between February 4 and 11 inclusive.

In addition to the district and division engineers the group includes the Director of Public Works seated in the centre of the picture, the assistant to the Director being on his right and the chief division engineer on his left.

The key to the group is as follows:—

C. LINDSEY (*Asst. to the Director*), WARWICK GREENE (*Director*), E. J. WESTERHOUSE (*Chief Division Engineer*)

Division Engineers.

D. E. HENRY, E. P. SHUMAN, H. F. CAMERON W. H. WAUGH, B. VON SCHMELING

District Engineers, (Standing)

L. W. SCHEIDEMANTEL, J. W. GRAHAM, S. BALUYOT, E. D. SMITH, L. S. BOGGESS, M. KASILAG, E. E. SCHENK, J. VALLARTA, R. AGCAOILI, A. W. AUSTIN, C. R. BENNETT, W. F. ROOT, J. C. CARPENTER, C. G. MORRISON, R. L. BARRY, J. R. BARRY, R. W. RANDOLPH, A. T. SYLVESTER, J. G. BECKJORD, H. A. RAIDER, R. L. ALLEN, L. T. CLARK, E. C. BROWN, O. N. POWELL, R. V. GLENN, J. H. CATON, J. A. HARRISON, H. R. MEEHLEIB, W. C. WEST, C. F. VANCE, R. A. WHITE, H. K. DAVIS.

AN ASPHALT SECTION OF THE MANILA-SOUTH ROAD

The road here parallels the shore of Manila Bay. The surfacing is 15 centimeters (6 inches) thick and 5 meters (16.4 feet) wide. As is frequently necessary, the stone had to be brought a long distance, in this case 60 kilometers (37 miles) by railroad and 2 kilometers (1.24 miles) by wagons. The view is a good illustration of the rapid growth of the suburban residence section 7 kilometers (4.3 miles) from the business section of Manila, and near a projected trolley line. All of the houses shown have been built within a year. Present traffic on the road is 1,600 vehicles per day and is rapidly increasing.

finished February 19, 1912. Its storage reservoir has a capacity of 308,196,000 gallons, and its distributing reservoir has a capacity of 4,000,000 gallons. The main pipe system is 6½ kilometers (4 miles) in length, and the total length of pipe in the distributing system within the city is 21 kilometers (13¼ miles).

Under the efficient direction of Mr. H. F. Cameron of this Bureau, the work was carried to completion without a single serious hitch, for less than the amount estimated and within the estimated time. The appropriation for the work was P.555,000, and the actual cost P.526,000, time for completion being twelve months.

The work done in Baguio and on the Benguet Road will be found under the heading of the Baguio Division.

Provincial Division

Under Mr. E. J. Westerhouse's capable management this division has become one of the most progressive in the Bureau. As already pointed out, a system has been installed which has stopped overdrafts and relieved the Bureau of the embarrassment arising therefrom. The work of the district engineers is being energetically directed, and a spirit of loyalty to the Bureau and to their work has been aroused, which promises great results for the future. Under the direction of this division, 279.2 kilometers of first-class road were constructed last year, and 101 kilometers of second-class road. Bridges and culverts were constructed to the number of 358, costing P.1,040,000. The amount of P.1,275,938.86 was expended on buildings, and 4,124 kilometers of first and second class road were maintained at a total cost of P.1,161,678.95.

Irrigation Division

Under Mr. W. L. Gorton's direction this division has been completely reorganized and is now operating on a very economical and business-like basis. It is constructing the San Miguel project in Tarlac, and is about to undertake the construction of the Santa Barbara project in Iloilo, which will cost P.800,000, and irrigate 3,000 hectares. It is also carrying on extensive investigation work and will soon be prepared to recommend in regard to several other projects.

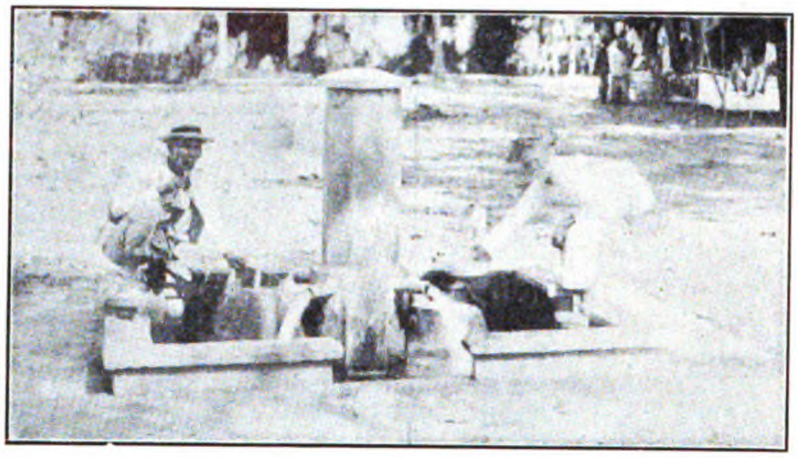
Artesian Well Division

The work of this division under Mr. J. W. Vickers, continues to run steadily and smoothly. The division now has in charge 25 deep-well rigs, and last year drilled 42 deep wells, at an average cost of P.21.00 per meter (P.6.43 per foot.) It also operated 42 jet rigs.

Division of Building Construction

The construction of insular buildings in Manila, now that this function has been taken over by the Bureau of Public Works, has been organized into a new division in charge of Mr. Jack McGregor, who was chosen for the purpose owing to the excellent showing he made on the construction of the San Miguel project and as Baguio engineer during the past season.

Division of Building Maintenance, Alteration, and Repair



AN IMPROVEMENT IN A MUNICIPAL WATER SUPPLY

This artesian well, on the plaza at Cabuyao, Laguna Province, was completed November 30, 1911, at a cost of P501.73. The flow is 100 gallons per minute. There were 145 other wells successfully sunk during the year, nearly all in thickly populated districts. These artesian wells usually replace the rivers or shallow open wells as a source for drinking water. There were altogether 684 wells in existence on June 30, 1912.

Formerly this division was one of the most troublesome in the Bureau. It was a great source of friction with other Bureaus, for whom this Bureau was performing innumerable petty jobs of repair, alteration, etc., and the men in charge of the work were constantly underestimating the cost of the projects and overdrawing funds available. Under Mr. Cook's direction, these conditions have almost entirely disappeared, and the work is now being done economically within the funds available, and generally to the satisfaction of parties outside the Bureau for whom the work is done.

Library

Formerly the few catalogues and technical books owned by the Bureau were not kept in such shape as to be readily accessible, and the maps, plans, and specifications also owned by the Bureau were not so systematically filed that they could be readily found. A library map-filling section has therefore been evolved, with Miss Stephens in charge, which is providing the Bureau with an immense number of technical catalogues, all properly indexed and classified, and has so filed and arranged about 30,000 maps, plans, and specifications belonging to the Bureau that they are accessible at a moment's notice to anyone desiring to use them.

Record Division

In the past year this division under Mr. Johnston, handled 85,000 communications, as compared with 60,000 the previous year.

Baguio Division

The Baguio division under Mr. Wm. M. Haube, supervises the work of four entities, namely:

1. Insular improvements in Baguio, including the custody of Government Center, and the general management of the Baguio season.
2. The maintenance of the Benguet Road.
3. The operation of the Benguet automobile line.
4. Baguio city engineer.

Insular Improvements in Baguio.—This Bureau is in charge of the construction and maintenance of all Insular public works in Baguio. In addition, it has the custody of all Government buildings and the assignment of offices and quarters to Government employees during the Baguio season. It has also the supervision of the Government mess, whether operated by the Bureau itself or by contractor, and is in charge of the equipping and renting of about 53 Government cottages.

The past season was the most successful Baguio has had. It commenced in the middle of February and lasted until June. During the greater part of this period, all accommodations, both public and private, were taxed to their utmost to care for the people visiting Baguio. A very encouraging sign for the future of Baguio is the large number of private cottages and buildings that are now under construction. No extensive constructing work was done by the Insular Government during the year, although considerable improvements were made at Teachers' Camp and for the Constabulary. The telephone and water systems

A MACADAM ROAD

This is a view of one of the principal roads of Iloilo Province taken near the town of Pavia in a sugar-producing district and some distance from the provincial capital. The road was completed in 1908 and has since been maintained at an average yearly cost of P.450 per kilometer. It is surfaced with hard gravel 15 centimeters (6 inches) thick. About one-half of the first-class roads in the Islands are surfaced with hard gravel.

operated by this Bureau were on a self-supporting basis, receipts being sufficient for all expenses.

Maintenance of the Benguet Road.—In July of last year, the Bued Canyon, in which the Benguet Road lies, was visited by an extraordinary storm, during which 46 inches of rain fell in one day, and 88 inches in four days. This unprecedented rainfall, falling on the bare, precipitous sides of the canyon, with its disintegrated and unstable geological formation, resulted in extensive damage to the Benguet Road, although the upper half of the road, between kilometer 17 and Baguio, showed a stability not seen during previous floods on the road. Great destruction on the lower part of the road was caused by two enormous slides at kilometer 13, the contents of which were estimated at over a million and a half cubic meters. These two slides formed a natural dam 150 feet high, impounding the water to that height. During the few hours of the existence of this dam, gravel was deposited for a distance of several kilometers above the dam to a height of 12 and 15 meters (40 and 50 feet) above the former river bed. The bursting of this dam let loose a tremendous flood, which swept down the canyon, tearing out the steel bridge at kilometer 13, and the suspension bridge built by the railroad at Camp One, and otherwise inflicting great damage all along the lower part of the road. Baguio was cut off from all communication for about eight days, at the end of which time engineers of this Bureau were first able to traverse the road and make an examination thereof. The serious condition of affairs was realized at once, and it was apparent that it would be months before the Benguet Road would be opened. It was therefore evident that temporary communication with Baguio must be established via the Naguilian Trail, which passes out of Baguio on the west side and goes through Naguilian to Bauang, on the coast, from which place there is a first-class road to San Fernando. Through the energetic work of the Mountain Province officials, the portion of this trail which lies within their jurisdiction (36 kilometers, or 22 miles, in length) was soon placed in condition to pack supplies to Baguio by mules and Igorotes, and eventually it was opened to cart traffic. Some temporary work was also done on the portion within the Province of La Union (15 kilometers, or 9 miles.) At this date, October 19, 1912, the portion from the coast to Naguilian (8 kilometers, or 5 miles) is first class and the portion from Naguilian to the Mountain Province boundary at Ripsuan (7 kilometers, or 4 miles) is second class. Mr. Will Arthur is in charge of this work.

The reconstruction of the Benguet Road at first seemed doubtful. The roadbed for several kilometers had disappeared under a vast deposit of gravel and boulders, and the location of a new road, higher up on the mountain side, was believed to be beyond the means of the Government Numerous schemes were taken under advisement by the authorities, some of them prepared by the Bureau, and to the great satisfaction of all concerned, eventually a contract was signed between the Government and the Railroad for the construction of a railroad into Baguio on the west side, leaving the coast at Aringay. It was evident, however, that adequate communication must be established with Baguio during the two to three years the railroad would be under construction. This was made possible by a tremendous rainfall in September, when 31 inches of rain fell in 24 hours, which cut through the great gravel deposit and swept a large part of it away, making it possible to reconstruct a road more or less on the location of the old road in this section. The work of reopening the road was started in October and vigorously prosecuted to its completion. On December 22, automobile trucks were able to travel the entire length of the road. The cost was about P.100,000, and while the work in many places was cheap and unsubstantial, it served the purpose. The credit for the economy of the work and the remarkably short time in which it was accomplished is due to Mr. Will Arthur, who has been employed for many years on the road, and for his work in opening the road was made superintendent of the same on the first of January, 1912. As soon as the road was opened, a tremendous traffic over the same began, which was continued until July 1. At the date of writing (October,) traffic is still being maintained over the road with some minor interruptions in spite of the heavy rains. The total cost of all the work done on the road last year, including the repair of the damage from this unprecedented storm, was P.253,000, which includes the payment of 8 per cent. surcharge to this Bureau. The actual cost of the work itself was P.234,250. Popularly the Government has been credited with the expenditure of larger sums for this purpose, but the actual figures are the above, which show that under the most adverse conditions the road can be maintained at a cost not out of proportion to its importance as the main line of communication into Baguio. During the past five years the cost of this road was least in 1908, when it cost P.164,-363. It will thus be seen that last year the cost was only P.89,000 above the lowest year. The highest year was 1910, when it cost P.358,-685. The average cost of the road for the past five years has been about P.248,000, including contributions toward maintenance of the central organization of the Bureau of Public Works and including improvements as well as maintenance. With the opening of the railroad into Baguio, the traffic on the road will drop off to such an extent that the cost of maintenance will be very much lessened, as a considerable portion of the maintenance is not due to floods, but to the wear and tear on the road surface and bridges from the exceedingly heavy traffic, and to the necessity for rush work and expensive work to keep the road in condition for traffic during the rainy season. If it is deemed advisable to continue the maintenance of this road after the railroad reaches Baguio, it can be done at less expense than at the present time.

Operation of the Benguet Automobile Line.—During the year this line with Mr. Wm. T. R. Price, in charge, carried over 19,000 passengers without accident or injury to any of them. Considering the conditions under which this automobile service is maintained, this result is considered remarkable, and may be attributed to the strict discipline maintained, and to following railroad practice in running automobiles in trains and regulating the traffic by a regular block system, with gates, gate-keepers, and telephones. The main reliance of the line

(*Continued on page 434*)

HONOLULU IRON WORKS CO.

Important Sugar Installations

The activities of the Honolulu Iron Works Company in 1913 promise to be far more extensive than in any year of the company's existence. A number of large and important works are now in hand and so great is the demand that the Works are being extended. For example, modern works are being built in Hilo, Hawaii to deal with the sugar machinery required for that Island. These will cover a large area and will be in every way up to date. The estimated cost is $150,000, U.S. Currency. Moreover a new office and store room are being built in Honolulu, which will be by far the largest building there, with the exception of the Young Hotel. The cost will be in the neighbourhood of $175,000 to $200,000 U.S. Currency.

The Works are now building in Cuba what will be the largest sugar factory in the world which was ordered by the Czarnikow & Kionda Co., Wall Street, New York, for the Manati Sugar Co. The location is on the north coast of Cuba not far from Chaparra. This factory will have an initial grinding capacity of 1,800 tons of cane per day, which will, in the following year, be increased to 3,600 tons, and the year after to 5,500 tons. This will be the ultimate capacity and beyond question the factory will be the largest in the world. It will be thoroughly modern and will be equipped with all the latest and best adapted machinery for making raw and semi-refined sugar in the most economical and efficient manner. The first unit will be ready for grinding by the end of the present year.

An order has also been received for the San Carlos factory to be built on the island of Negros, Philippine Islands. This is an Hawaiian company formed by prominent Hawaiian sugar agencies. It is called the San Carlos Milling Company and has made contracts during the past couple of years with the principal planters in the district to furnish the necessary cane for an initial grinding capacity of about 1,000 tons of cane per day. The Milling Company also constructs railroads, wharves and warehouses: in fact everything required for a central milling plant and the cane from the planters will be delivered and loaded on the cars at the loading stations. Mr. Paul J. Bell, formerly of the Honolulu Iron Works Co., is Mill Manager.

Another contract that has been received by the Honolulu Iron Works Co., is one for the building of a sugar factory for the Calamba Sugar Estate about twenty miles from Manila. This company was started with San Francisco capital and the trustees are headed by Mr. Fleishhacker of the Anglo London and Paris Bank. The factory will have an initial capacity of 1,200 tons of cane daily, but will be built for doubling up; it will be truly modern in every respect with 12 roller mill and crusher, etc., to produce sugar in the most economical and efficient manner similar to what is done in the Hawaiian Islands. Mr. L. Barkhausen, formerly manager of the Pioneer Mill, is the manager of this large estate and Mr. N. Campion, formerly of the Ewa Plantation, is engineer.

The Mindoro factory, it may be mentioned, is starting its first grinding season, at the outset grinding a comparatively small amount of cane. This factory was built for a final grinding capacity of about 2,500 tons of cane per day. Mr. G. Fairchild, formerly manager of Makee Sugar Co., Kanai, Hawaii Islands, has gone into partnership with Messrs. Welch and Havemeyer of New York, and is the resident agent at Manila for the Mindoro and San Carlos Companies, whereas the Pacific Commercial Co., agents for the Honolulu Iron Works Co., in Manila, are the agents for the Calamba Sugar Estate. The Works are now building a new sugar factory for the Kohala Sugar Co., in which most of the old machinery has been installed in a new steel building and everything brought up to the most modern condition.

A complete new sugar factory for the Koloa Sugar Co., Kanai, is also being proceeded with. This will be in every way thoroughly up-to-date, and the Kopke Centrifugal Clarifying System will be installed. This is a new invention by the chief engineer of the Honolulu Iron Works Co. Briefly all the juice is passed through centrifugals as in a cream separator so that the clear juice is immediately extracted and the impurities in the form of mud automatically discharged. This invention has been in operation as an experiment in the Hawaiian Islands for the past year with great success. It eliminates settling tanks and filter presses and reduces to the greatest extent the amount of juice on hand. It is practically cleaned mechanically from the time the juice leaves the liming tanks until it enters the supply tanks for the evaporators. This invention has not yet been offered on the market.

The *Seoul Press* tells a story which it says is "from an exchange" but which reads like one of Mr. Benjamin Trovato's. Whenever a Viceroy travels in India, says this very highly salted yarn, policemen are stationed along the railway line at intervals of a hundred yards. "The policemen often become sleepy and then lie with their heads on the line to listen for the approach of the train. On one occasion no fewer than 50 lost their heads."

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

A HUGE UNDERTAKING

Probably the most notable railway electrification project at the present time is that about to be undertaken in connection with the suburban steam railways of Melbourne, Victoria, Australia. The advisability of the step has been under consideration for a number of years, and in 1908 Mr. Charles H. Merz of the firm of Messrs. Merz & McLellan, Victoria Street, Westminster, London, presented a comprehensive report on the subject to the Victorian Railway Commission. In this report Mr. Merz, acting as consulting engineer on the scheme, went very fully into the whole question to the substitution of electric traction on steam railways.

Since that time a number of important railways have been electrified in all parts of the world, and experience has demonstrated the great advantages and economies which result from this mode of operation. In this particular case, the rapid growth of the suburban business in and out of Melbourne was also a decisive factor that emphasized forcibly the need for electrification Recent practice especially has shown that the adoption of the high voltage direct current system by a number of roads has resulted in eminently successful and exceptionally economical operation both for suburban and through service.

In a later report, embodying a comparative analysis of the merits of both single phase alternating current and high voltage direct current systems, based on the tenders submitted, Mr. Merz points out that the adoption of the high tension direct current system for this application would mean a saving of about $3,500,000, or nearly 30 per cent., in the cost of installation over that of the single phase system. Accordingly, in view of this initial saving and a further operating economy, as indicated by Mr. Merz, of about $350,000 per annum, or nearly 28 per cent., he recommended very strongly the adoption of the high tension direct current system for the Melbourne Railways, and the Victorian Government accepted his recommendations.

Melbourne, the capital of the State of Victoria, is situated in the southern part of eastern Australia on the Yarra River, eight miles from its mouth at the head of Port Philip. The river is accessible for vessels drawing 22 feet of water, and all larger vessels are easily accommodated at Port Melbourne in Hobson Bay. Along the river are large docks, shipyards, foundries and manufacturing plants representing a number of industries. The city has a population including its suburbs of over half a million, and is next to Sydney, the most important municipality and greatest trade emporium in Australia.

The electrification of the Melbourne Suburban Railways is of exceptional interest because it will be one of the largest projects of its kind in the world, involving heavy rolling stock equipment with overhead collectors. The magnitude of the undertaking from the standpoint of equipment and service may be compared with that on the third rail electrified section of the New York Central Railroad out of New York City, and ranks with the Oakland, Alameda and Berkeley electrification of the Southern Pacific Railroad at San Francisco.

Naturally, the great size and tremendous importance of the project attracted world-wide competition, and all the leading manufacturers of electrical apparatus in every part of the world submitted tenders. After an exhaustive study and consideration of the relative merits of the several propositions, Mr. Merz approved in his report the recommendations of the General Electric Company of New York as to choice of system and economical features of operation, and the Victorian Government awarded this Company the contract for the rolling stock apparatus equipment, comprising 400 motor car equipments, consisting of four motors each; 800 control equipments, 400 of which are for trailer cars, and 400 air compressor equipments. This is the largest single order ever placed for electric railway apparatus.

The mileage of the suburban lines included in the scheme is made up of 150 route-miles, or 289 track-miles of running roads, and 34 miles of sidings. The potential selected for this direct current system is 1,500 volts. Power will be supplied from a central station at Yarraville, a suburb of Melbourne, in the form of three phase alternating current at 25 cycles per second and will be transmitted at 20,000 volts to twelve substations at various points on the system, where it will be converted into the operating direct current of 1,500 volts. The high tension transmission is by underground cables from the power house to the important substations in the central area, and by overhead wires erected on the same structures which carry the railway track conductors, to the outlying substations. Overhead conductors will be used throughout the system for supplying current to the trains, which will be equipped with roller pantograph collectors. The complete equipment of the railways involves the expenditure of $12,000,000 in round numbers, and Mr. Merz figures the saving of electric operation will amount to about $600,000 in 1915 over the former steam operated lines.

Normal trains, weighing about 180 tons, will consist of two motor coaches and two trailer coaches. The tracks are 5-ft. 3-in. gauge. The suburban traffic amounted to 70,000,000 passengers in 1908; the figure of the past year exceeds 90,000,000; and in 1917, when it is expected that the conversion to electric operation will be entirely completed, it is estimated that the suburban lines will carry 150,000,000 passengers per annum. The present plans are accordingly based on provision for this probable increase in the passenger traffic; but all parts of the electrification scheme are arranged so as to be capable of extension from time to time, as the traffic subsequently grows. Handling heavy traffic during the rush hours of morning and evening will be provided for by increasing the length of trains, although for this initial service it is the intention to have the maximum train consist of six coaches.

The motors, numbering 1,600 in all, which will be installed in the 400 motor coaches, will be of new design throughout and will embody the most modern developments that the General Electric Company has introduced in railway motor construction. They will be known as Type GE-237; will have inherent ventilation and be provided with commutating poles. They will be rated 140 horsepower at 725 volts and will be operated two in series on 1,500 volts.

The method of self-ventilation which will be incorporated in the design of these motors will assure exceptionally effective and uniform cooling. This will be accomplished by a broad-bladed centrifugal fan cast integral with the pinion and armature core head. Fresh air is drawn into the interior through a screened opening on the upper side of the motor frame at the pinion end. This is circulated over the armature and field coils, under and through the commutator, through longitudinal holes in the armature core, and thence exhausted to the exterior through openings in the pinion end bearing head.

Scientifically correct in principle, this method of ventilation has been demonstrated through service tests to be the most successful manner of securing evenly distributed cooling; for without complication it circulates effectively a large volume of cool air throughout the motor and keeps all parts at a uniform temperature, eliminating the possibility of "hot spots." The service capacity of the motor, due to its ventilation, is rendered much greater than that of an ordinary motor of the same nominal rating. At the same time, the weight per horsepower is greatly reduced without sacrificing mechanical strength, durability or electrical efficiency.

The service on the lines calls for both local and express schedules. The motors will therefore be arranged for tap field control, which will allow a free running speed of 52 miles per hour over level track for the suburban cars on express runs. This method of auxiliary control was introduced by the General Electric Company a number of years ago, but due to commutating limitations of earlier motors it was eventually abandoned. Its successful application to commutating pole motors is therefore modern.

The principal advantages to be derived from tap field control are increased operating efficiency, continuous saving of power, economy effected through decrease in the weight of the equipment and an increase in the service capacity. The practical effect of tapping the field is to eliminate one resistance stop and to secure the desired accelerating effort throughout from start to full speed with a lower current input.

The 800 control equipments for both motor and trailer cars will be the well-known Sprague-General Electric Type M relay-automatic control and do not require description. They provide for multiple unit operation and control of the train from the platforms of any motor or trailer car. Type M control has been in operation on heavy traction work for many years, notably on the subway and elevated divisions in New York and other large cities, and has demonstrated its simplicity, low maintenance and reliability.

It is interesting to note that two of the principal factors that apparently influenced Mr. Merz and the Commissioners to decide in favor of the high tension direct current system, rather than the single phase alternating current system, were the lower maintenance of the rolling stook equipment and the saving in energy consumption. They found that the greater number and complexity of the electrical parts carried on the coaches in the case of the single phase equipments not only causes these equipments to be initially more expensive, but also renders them more costly to maintain; and when routine inspection is taken into account, and also the fact that repairs are necessarily subject to the exigencies of traffic requirements, the maintenance of single phase equipments would exceed that of direct current equipments in a slightly higher proportion than that governing their respective first costs.

The GE-237 direct current motor selected for these equipments is designed especially to obtain low energy consumption. This comparison of energy consumption is included in Mr. Merz' report in the number of kilowatt-hours required by a four-coach train making a round trip between Sandringham and Broadmeadows. Based on the several manufacturers' guarantees, Mr. Merz arrives at an economy of 23 per cent. in energy consumption in favor of the high tension direct current equipment.

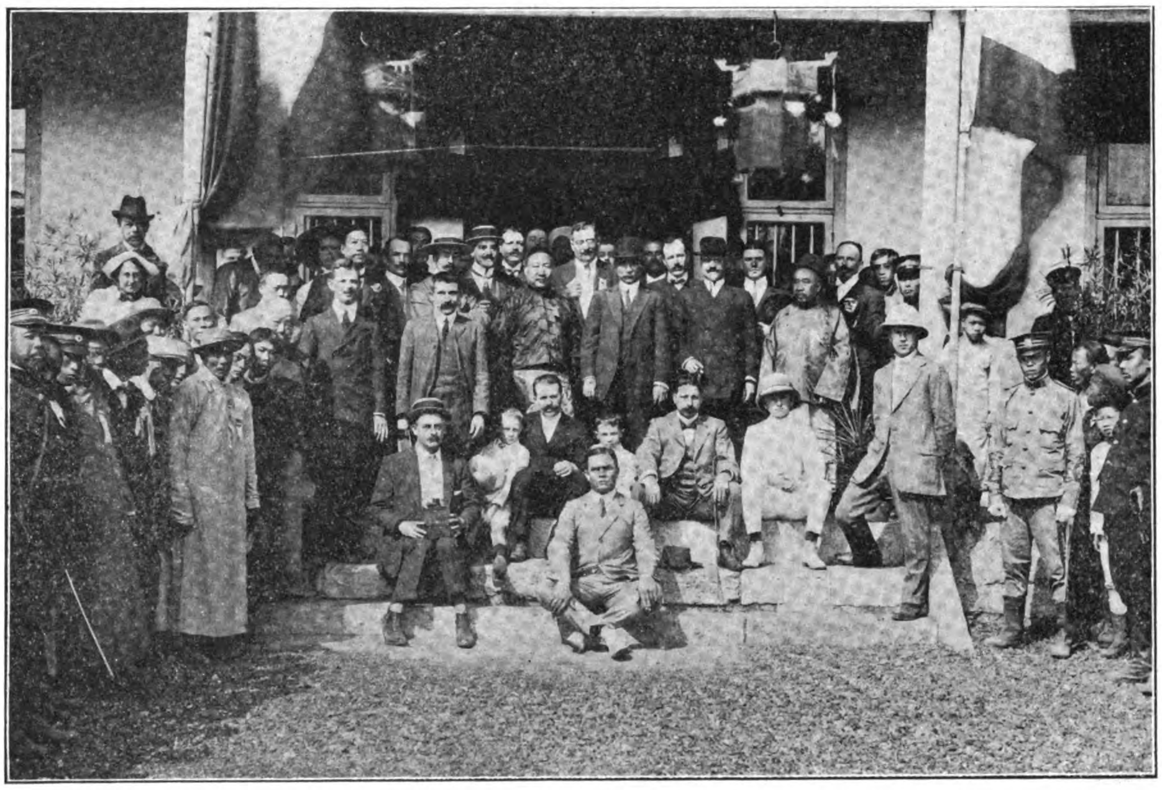
Other points that were brought out as being adverse to the single phase system for this application might be mentioned, as follows: slightly reduced seating capacity of the trains on account of the extra amount of room required by the single phase equipments; the extra wear on the track rails due to the extra dead weight of the single phase motors, and the extra amount of spare plant required in connection with the single phase scheme on account of the greater complexity of the equipments. As we have indicated, Mr. Merz estimated that the annual operating cost of the single phase system would be about $350,000, or nearly 28 per cent., more than for the direct current system, and he also came to the conclusion that the latter system would show an increasing advantage over the single phase system as the traffic becomes greater year by year.

Electrification of steam roads both in America and abroad has emphasized the fact that the conversion to electrical operation is always accompanied by a faster and more frequent train service, and because of greater convenience, comfort and cleanliness, a general improvement in suburban traveling conditions, while the reduction in working cost and the increased earning of the line combine to produce larger profits.

A WORD ON THE KAILAN COAL-MINES

[BY R. R. G.]

In a previous article the writer had occasion to discuss the latent possibilities of the port of Chinwangtao, and, incidentally was compelled to give a short account of the Kailan Mining Administration from the date of its inception until now. In the present article it is proposed to discuss some of the many industries springing from this Kailan Mining Administration, but first we must run over old ground and find out what we can about this mysterious Administration of apparently mushroom growth. We know it is more or less interested in Coal-Mining. We are told it is interested in many sorts of bricks. Upon enquiry we also find it operates in tiles and fireclay and pipes. It has a line of freight-passenger steamers besides; and yet in spite of its obviously great dynamic energies, we are strangely unfamiliar with the word and cannot help feeling uncomfortably ignorant of the dynamo from which all these wonderfully active, wonderfully new, yet wonderfully ubiquitous industries spring. To dissipate these feelings we must wander back some unaware of the huge unsuspected potentiality which lay like the genii of the story books bound and black and mighty beneath their miserable mortal feet. Such being the circumstances, can we not imagine the original owners' satisfaction when a certain Chinese gentleman named Tong King-sing came forward in 1878 and offered to buy these putative worked out Mines. It was his intention, under the patronage of the late Viceroy Li Hung-chang, to establish a mining company composed entirely of Native investors. With their money he proposed to work the Coal district not as heretofore by scratching the outcrop only, but to mine this time altogether in accordance with European methods. Thus it was, in 1878, that the old Chinese Mining Company uttered its new-born cry; and for the next twenty years its Chinese nurses looked after its well-being more or less successfully. There is no necessity for us to follow all the changes and chances of this period of adolescence beyond observing that it contrived to struggle along as Chinese Administration was not of such long duration, nor did it enjoy the privilege of prearrival, of being the first Company on the scene. But despite these drawbacks its life had begun in the land of cheap labour, in the land where even Governments seem able to carry on the work of administrating without the aid of money, in the land where wonders will never cease, and where prophets are ever wrong; so that instead of being adversely affected by damaging competition, the Lanchow Mining Company was able to extend its business and actually to compete with rivals already well established. One of these must necessarily have been the Chinese Engineering & Mining Company, seeing that both Companies were engaged in the same industry, and were furthermore situated in closest proximity to one another. Therefore it was wisely decided to put a stop to any trade rivalry by operating both concerns conjointly through one Administration to be named hereafter the Kailan Mining Administration, with its head quarters at Tientsin.



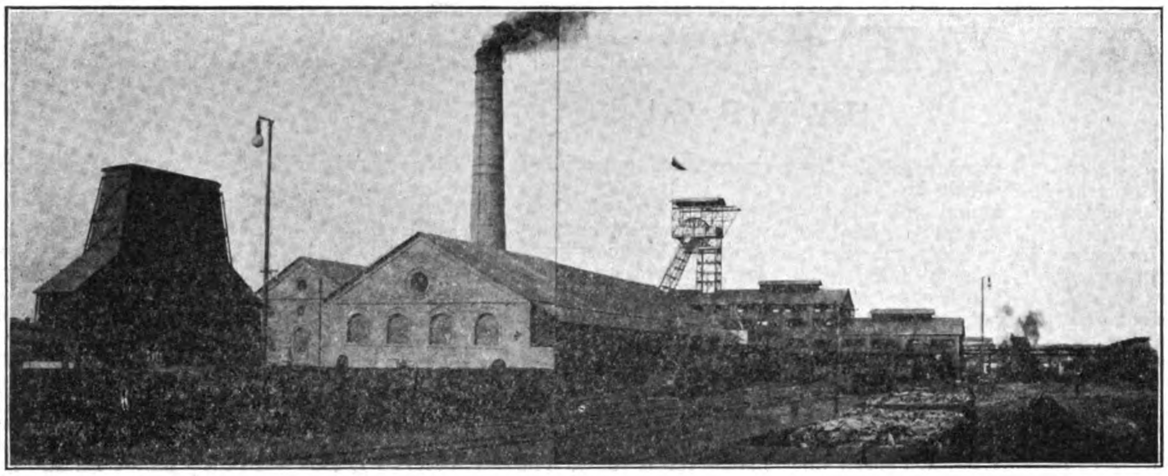
THIS PHOTOGRAPH WAS TAKEN WHEN DR. SUN YAT-SEN VISITED THE MINES AT TONGSHAN ON SEPTEMBER 24, 1912
MAJOR W. S. NATHAN, THE GENERAL MANAGER, IS SEEN BEHIND AND TO THE LEFT, WHEN LOOKING AT
THE PHOTOGRAPH OF DR. SUN YAT-SEN. MR. A. DOCQUIER, ENGINEER-IN-CHIEF
IS ON DR. SUN YAT-SEN'S RIGHT WEARING A HAT

thirty-four years over the hills of time, whence we can observe the story of earlier Chinese mining meandering slowly through autumnal years until it purples away into yet more misty obscurity.

Prior to that date Chinese Coal Mines were only scratched on the outcrop, they were not treated scientifically for the very simple reason that the natives of the day had no facilities for modern mining. Their commercial instincts told them rightly enough that "black stones" had some calorific value. Accordingly they searched for them, found them all along the Kaiping coastal district, and dug up as many of them as they could with the miserable appliances at their disposal. Beyond that they merely sat down satisfied more or less at having accomplished so much, but wholly a purely native concern until the fatal year 1900—the year of the Boxer outbreak. Then like many another of its kindred institutions it passed into foreign hands, hands which alone in China seem able to put big undertakings upon a firm financial footing, and to staunch the ebbing life-blood of a constantly leaking expenditure. As these hands are so well able to look after it, we will leave it for the time being, whilst we turn to contemplate a similar company, also operating in Coal, also composed entirely of native investors, also working altogether on European lines, which sprang into existence a few years later. Its name was the Lanchow Mining Company, Limited, and the history of its birth bears a striking resemblance to that of the old Engineering & Mining Company. True, its run of life under purely

When this scheme crystallized from possibility into fact a short while ago, the last word in the histories of both Companies had been written, and the curtain was immediately rung down upon both their old independent names. In their place the Kailan Administration is now in front of the curtain and if we listen attentively to its epilogue we shall probably hear a great deal about the follies of competing with friends, and a great deal more about the advantage of maintaining the price of Coals.

So much then for past histories, we can now take a trip down to Tongshan and see for ourselves the big, black, busy chimneys, the grimy coolies, the coal trucks, the head-gear of each mining shaft, the dumps of slack, and the hundred and one other items which make up the coal-mining picture all the world over.



KAILAN MINING ADMINISTRATION.—THE TONGSHAN COLLIERY

We must not, however, go away with the idea that Tongshan is the only place in which the Administration has interests. On the contrary it has mines at Machiako, at Chaokochwang as well as at Linsi. At Machiako there is one shaft. At Chaokochwang there are two shafts. At Linsi there are two shafts, and at Tongshan four. All these places are in the Kaiping Coastal district midway between the ports of Tongku and Chingwangtao with which they are connected by the Chinese Government railway system. At Tongshan there is an electrical installation for pumping and lighting which is reputed to be one of the finest in the East. It cost considerably over a Million Dollars (Mex.) and its boiler house is complete with 17 Cornwall-Galloway Type boilers. The surface of the mine is lit by 48 are lamps and by 300 glow lamps. Underground there are 5 motor-driven centrifugal pumps having an individual capacity of 1,200 gallons per minute against a head of 750 feet.

At the time of writing the output of coal from all the mines is about two million tons per annum, and this output could easily be exceeded if local consumption demanded that a further acceleration should be made. The various qualities of the coal obtained are expressed by the following nomenclatures:—

Navy Lump, Loco Lump, Linsi Lump, No. 5 Slack, No. 1 Slack, No. 2 Slack, and Special Coke.

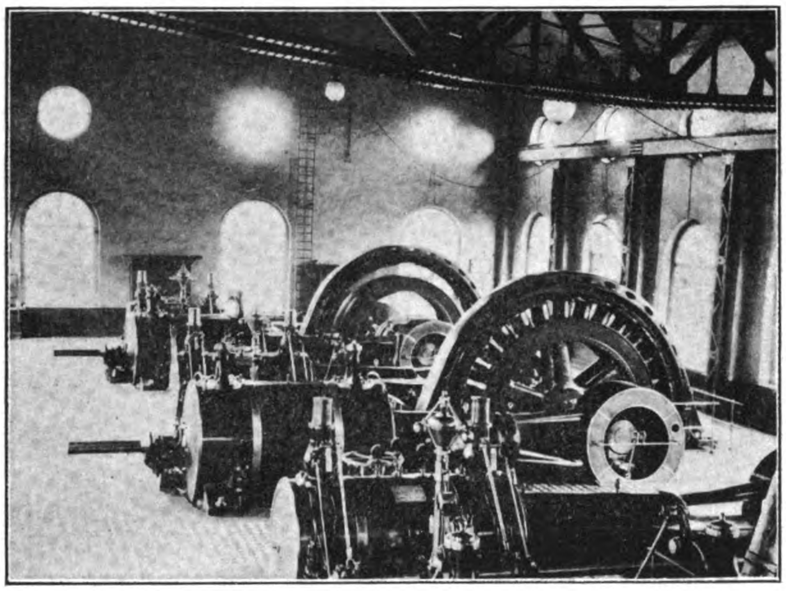
Each of these qualities, though perhaps unfitted for other purposes, is unrivalled for the specific uses to which it is customarily put.

Take No. 5 Slack for instance. This is undoubtedly a super-excellent Slack coal, but its chief advantage is its adaptability to the manufacture of an excellent coke. Again, Navy Lump is the finest coal for industrial purposes to be found anywhere East of Suez. It is nearly smokeless and gives a very small percentage of ash. It is often used for Naval purposes, but its supply unfortunately is not without limit.

For railway work and bunkering, Loco Lump is now the premier coal in the North China Market. It is highly bituminous and for raising steam it can show the most excellent results.

But there is one little fact which is sometimes overlooked by foreigners in China.

Strange as it may sound to them, there is an indigenous race of men living there with sallow faces and apparently inverted tastes. One of these apparently inverted tastes has imbued these strange men with a particularly strong sense of the advantages of buying Slack coal. They find it excellent for their various purposes, and it is moreover so remarkably cheap. Accordingly a large market in Nos. 1 and 2 Slack has sprung up, and enormous quantities of this coal are sold annually in increasing quantities



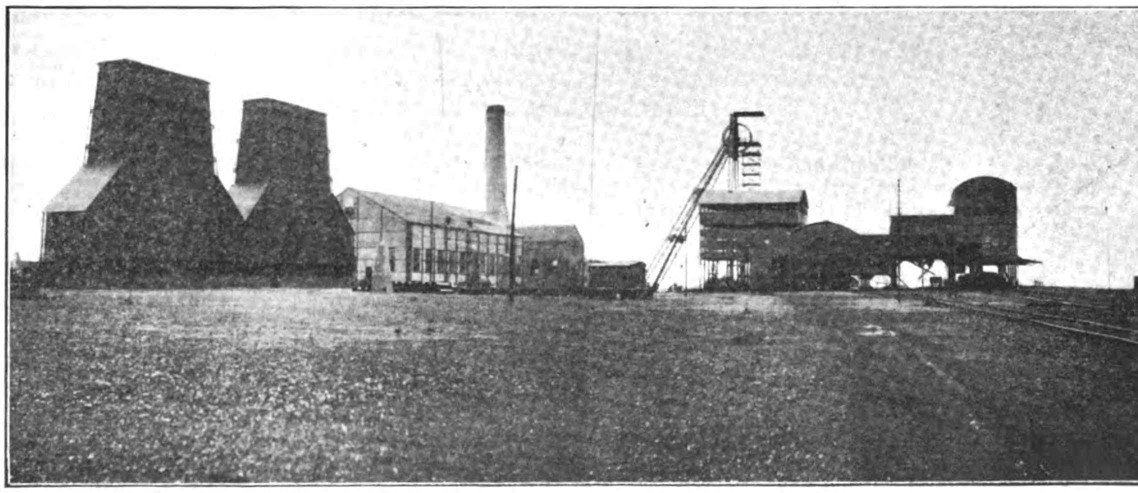
KAILAN MINING ADMINISTRATION.—THE POWER HOUSE AT TONGSHAN

until Kailan Coal may be said to shed a glow of warmth upon North China in defiance of the Lady Winter who spreads her ermine cloak down from the North in vain.

Up to this point we have peeped at Kailan Coals, but have not touched upon the Administration's other products although several of these deserve more than a cursory mention.

To begin with, there are the fireclays; these obedient to Geology's unfathomable laws are found in close association with the coal seams, with a sufficiency outcropping upon the Administration's property to justify the boast, that their stock is almost inexhaustible. In class too they are declared by experts to be excellent, resembling in appearance the Stourbridge Clays of England, but reputed to be of even better quality. Next we turn to the firebrick factory at Tongshan, with another subsidiary factory at Linsi. The factory at Tongshan is quite one of the finest in the East. It is entirely up to date, and at present is putting out approximately 50,000 tons per annum. Were it deemed advisable to work at fever pitch there is no reason to doubt that this output could easily be doubled, for the equipment is quite capable of handling 100,000 tons per annum without straining the Administration's plant or the writer's reputation for veracity.

All up and down the Pacific Coast-lands, through contract after contract these bricks are strewn; here a few in Singapore; there half a million in San Francisco. They will tell their tale to the sons of Unborn Empires in future days to come. Then, when Tientsin shall have become as old, as dead, and as venerable as Babylon is to us now, some antiquarian may stumble across a K. M. A. brick, and with ecstasy will read upon it not only the hieroglyphics K. M. A. but also the more important message of progress which white men brought to far Cathay at that long forgotten period. But there is no necessity for us to look two or three thousand years ahead; for the moment we are more concerned with things nearer our own times amongst which we might mention tiles. The Kailan Mining Administration makes tiles, and makes earthenware pipes besides. In both these commodities a steadily increasing trade has been established, and the busy grinding mills or smoking kilns at Tongshan are a reminder that yet more activity may be expected when the outside world shall become better acquainted with these latest products of the Kailan Mining Administration.



KAILAN MINING ADMINISTRATION.—THE LINSI COLLIERY

COMMERCIAL ACTIVITIES IN MANCHURIA

(By Consul General Fred D. Fisher, Mukden.)

While Manchuria was not an active field in the political unrest of China in 1911, these Provinces felt many ill effects from the turbulent conditions farther south. Many of the native banks had put out large note issues without regard to specie reserve, and spasmodic runs were made on these banks by holders of the notes, so that exchange rates between local currency and gold and silver yen and Pei Yang, Hongkong, and Mexican dollars were kept much below normal. The Mukden mint, which had suspended operations preparatory to minting coins of the new issue, resumed the minting of small coin, and from the end of September to the end of the year about two-thirds of the total coinage of small coins for the year, amounting altogether to a value (United States gold) of $5,094,984, was struck.

The pneumonic plague made necessary almost a complete suspension of the cart traffic during the first part of the year, at a season when the ground was frozen and when goods are usually largely transported from the interior, as Manchurian roads are almost impassible when the frost is out of the ground. In certain sections of Fengtien Province the heavy summer rainfall ruined growing crops and made necessary the prohibition of the exportation of cereals from these districts.

Industrial establishments opened during the year included two in Mukden, one for weaving cloth from foreign thread and the other for weaving shirting, one in Changchun, the Changchun electric light works, and one in Chen An Hsien for dyeing cloth. The Japanese Government began the construction in Mukden of consular premises to cost $124,500 (United States currency) and others at Changchun to cost $99,600, and the mission of the United Free Church of Scotland began the construction of a medical college.

On November 1, 1911, the standard-gauge railway line between Antung and Mukden was opened to traffic. This is a part of the South Manchuria Railway system. Express trains operated in connection with the Siberian express system and the Korean Government Railways are run thrice weekly over this line, covering the distance in 6 hours and 20 minutes and diverting much of the passenger traffic to and from Japan from the old route via Dairen (Dalny). By the new route, via Antung, Fusan, and thence across the Japanese Sea to Shimonoseki, the journey between Mukden and Yokohama is made in 61 hours, a saving of about 83 hours over the old route. It is doubtful if the line will take an important part in the freight traffic for some time to come.

The crops of Kirin and Heilungchiang Provinces for 1911 were reported to be about 30 per cent. better than in 1910. The principal crops of Fengtien Province and their value per ton were—kaoliang, 3,809,773 tons, value $20; millet, 1,347,829 tons, value $22.15; corn, 293,773 tons, value $21.60; beans and peas, 306,625 tons, value (of the principal kinds), $21.57. The output of coal during 1911, not including that mined in the various small mines worked by hand by the natives, was 1,424,795 tons.

Manchurian Trade

The total trade of Manchuria in 1911 increased 16 per cent. over 1910, the figures (in United States currency) being as follows:

	1910	1911
Net total foreign imports	$37,480,457	$44,534,988
Net total native imports	16,189,721	17,937,313
Net total imports	53,670,178	62,472,301
Exports to foreign countries	36,361,811	41,800,815
Exports to Chinese ports	19,798,717	23,123,552
Total exports	56,160,528	64,924,367
Total trade	109,830,706	127,396,668

Of the total 1911 imports, foreign goods amounting to $34,008,432 came through South Manchurian ports (Newchwang, Tatungkou, Antung, Chinwangtao, and Dairen) and $10,526,556 worth through North Manchurian ports (Aigun, Harbin, Hunchun, Lungchingtung, Manchouli, Sansing, and Suifenho). Native imports amounting to $16,506,561 came through the former and $1,430,752 through the latter, and exports valued at $47,250,519 passed through the ports of South Manchuria and $17,673,848 through the ports of North Manchuria. Of the trade passing through the southern ports 38 per cent. went through Newchwang and 33 per cent. through Dairen.

The increase in the imports from foreign countries was principally in the items cotton piece goods, flour, bags, fish, and hides, and the increases in exports to foreign countries were largely in cereals, flour, meats, silk, bean cake, and bean oil. The export trade of Manchuria goes principally to Japan and to the Chinese ports to the south. Europe takes some soya beans, raw silk, wool, skins, bristles, etc., and there is some export trade in flour, wheat, cattle, etc., with the Siberian frontier. America's share in the trade is practically nil. The Manchurian wild silk that reaches the United States passes through the port of Chefoo, and Manchurian bean oil goes to the United States by way of either Japan or England, while the shipments of Manchurian honey are made chiefly from some of the South China ports. Nearly one-third of the total trade of Manchuria, or $41,000,000 of the $127,000,000, was with Chinese ports.

A MANCHURIAN FARM SCENE

Primitive Farming Methods—No Sale of Modern Farming Machinery

The modern coal-mining, bean-oil, and flour-milling industries of Manchuria are practically in the hands of foreigners. In such an immense region, lying near large markets for agricultural products, where climate, soil, and low price of farming land offer so much encouragement to modern agriculture an extensive trade in modern agricultural implements would be expected. This is not found, however, as a one-handled iron-shod wooden plow, a stone or wooden roller, a few hoes, mattocks, axes, picks, wooden forks, and mules, and donkeys comprise the equipment of a Manchurian farmer.

Crops are planted in rows about 18 inches apart, and as the growing season advances the soil is ridged up against the crop rows. So long as the Manchurian farmer insists on this method modern implements would be useless. In the southern part, which has been settled for many generations, the small size of the average holdings would also mitigate against the use of farming machinery, but in the north it might be extensively introduced by patient education and demonstration. As a rule, the Manchurian farmer raises but little live stock.

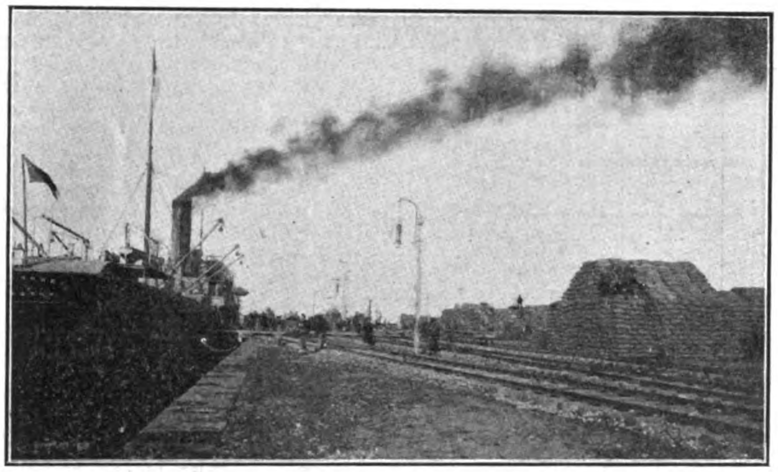
Most Important Articles of Foreign Trade

The exportation of soya beans and their products from the ports of Manchuria in 1910 and 1911 were, respectively, as follows: Beans, 828,924 tons and 818,108 tons; bean cake, 621,027 tons and 911,881 tons; bean oil, 44,083 tons and 65,993 tons. About 280,000 tons of beans and 32,000 tons of bean oil were exported to Europe. The average export prices for the year were about $19 per ton for beans, $16 for bean cake, and $72 for bean oil. Two of the largest British houses exporting beans suspended in 1911 because of difficulties in securing delivery on forward contracts. On the other hand, one of the largest Japanese firms is rapidly increasing its proportion of the bean export trade. Exports of other products included barley, 14,268 tons; kaoliang, 61,270 tons; maize, 14,419 tons; millet, 69,849 tons; and wheat, 135,520 tons. The export of wild raw silk amounted to 1,439 tons against 993 tons in 1910, of wild cocoons 7,629 tons against 7,340 tons the year before, and of silk refuse or waste 1,297 tons in 1911 and 703 tons in 1910. The price of cocoons remained about the same as in 1910, or $3.90 per 100 pounds.

Of the imports from foreign countries the sugar comes chiefly from Hongkong, Japan, and Russia, the candles from Great Britain, the matches from Japan and Russia, and the lamps from Japan and Germany. The most valuable import item is cotton piece goods. Before the Russo-Japanese war the United States manufacturers enjoyed the larger part of the trade, with English manufacturers second and Japanese third. The order is now almost reversed, as the following table of imports of the principal kinds of cotton piece goods from these countries in 1903, 1910, and 1911 shows:

Kind of cotton goods.	1903	1910	1911
Shirtings, gray, plain;	*Pieces.*	*Pieces.*	*Pieces.*
American	38,470	146,391	144,764
English	95,317	94,785	142,521
Japanese	5,440	25,871	6,970
Sheetings, gray, plain:			
American	1,033,089	378,124	403,399
English	5,200	15,231	16,953
Japanese	71,100	694,574	1,032,926
Sheetings, white, plain, English	60,987	205,587	343,112
Drills:			
American	569,625	186,698	160,420
English	480	6,750	4,400
Japanese	3,100	252,342	355,788
Jeans;			
American	92,410	3,968	5,[illegible]95
English	25,310	323,246	484,891

The figures for 1903 are for the port of Newchwang, as practically the whole of Manchuria's trade at that time was shipped through that port. Japan has also developed a large trade in cotton cloths, velvets and velveteens, cotton blankets, imitation native nankeens, etc. During 1911 one of the largest American houses took up the question of marketing American piece goods in Manchuria, and considerable progress was made in establishing a system of distribution and in opening markets.



PILES OF SACKED BEANS AT THE DALNY WHARVES AWAITING SHIPMENT

Increased Flour Trade—American Articles Sold Here

The United States shared to the extent of 120,000 barrels in a large increase in the importation of foreign flour, which amounted to 270,837 barrels in 1911 against 78,362 barrels in 1910, imports of native flour amounting to 106,000 barrels in 1911 and 164,846 barrels in 1910. Normally this market is supplied by the Japanese mills at Tiehling and the Russian mills at North Manchuria, the products of which are not included in the foregoing figures.

An instance of the advantage of having a reliable and well-established method of distribution for American goods in this market was recently brought to the attention of this office by Chinese merchants desiring to buy American flour. One of the firms here holding the agency for American flour owns a flour mill of its own in Manchuria. These Chinese merchants have informed me that whenever they ask for American flour they are told that of course if they really wish the American article they can have it, but their own native flour is better and is recommended.

STACKS OF KIAOLIANG

Imports of kerosene in 1910 and 1911 were, respectively, as follows, in gallons: American, 10,132,561 and 11,214,229; Borneo, 10,000 in 1910 (none in 1911); Russian, 2,261,808 and 1,977,737; Sumatra, 2,515,815 and 2,463,971; other kinds, 21,960 and 65,770. American sewing machines are finding a fair market in South Manchuria; one company, which is building up a fair system of distribution, sold 1,500 machines during 1911. There was a moderate demand for American roofing preparations and for corrugated iron in 1911. A few heating stoves are being sold, but others are quick to produce imitations which can be sold so far below the genuine articles as to draw them out of the market. The sale of American condensed milk, evaporated creams, soaps, canned goods, etc., is confined chiefly to the foreign residents and is therefore not large.

American Trade Stationary—Trade of Other Countries Advancing

American trade in this district, with the exception of a few items, shows no increase. This appears to be due to a lack on the part of American manufacturers of interest, intelligent effort, and energy in the development of the market, probably because they consider their domestic markets more profitable than those in this district would be after they were developed. The dependence of Japan and the manufacturing countries of Europe on foreign markets for their prosperity causes them to extend diligently their foreign distributing systems with an eye to permanent future trade, at the same time gradually increasing their sales. The advantage of having patiently and intelligently developed trade along lines of its own peculiar requirement is of importance in retaining it. With regard to a large number of the items of American manufacture shown as coming into Manchuria the trade is fortuitous. Consumers here have heard of the articles and run them down. Many American articles are carried in stock at Shanghai and at Japanese ports and distributed to Manchuria through native merchants; others are ordered spasmodically through local commission merchants or middlemen.

With the simple requirements of these people the development of trade in modern manufactures, machinery, household conveniences, conveyances, implements, etc., is not a matter of competition so much as education and the creation of demand. That Chinese do not quickly take to foreign innovations is probably due to their lack of knowledge and an instinctive desire to avoid experiments which have proved expensive and fruitless. They are not, however, slow to adopt new methods when convinced that there is advantage or profit in doing so. To develop markets under these conditions necessitates acquaintance with the peculiar customs and requirements and a close and constant touch with the trade. Unfortunately for American trade there are no houses in this district doing a direct importing business.

Operations of Foreign Firms

In the peculiar conditions existing here, Japan is at a great advantage compared with other foreign countries. Its proximity permits its small merchants, who live almost as cheaply as the Chinese, to establish themselves in all the principal markets, while its larger mercantile houses have established extensive distributing systems throughout the country. With Japanese post offices and parcel-post facilities maintained in all the principal towns and with a special loan service conducted by the principal Japanese banking institutions by which money can be had at 4 to 6 per cent. per annum on good security, they are often at an advantage as compared even with the Chinese merchants.

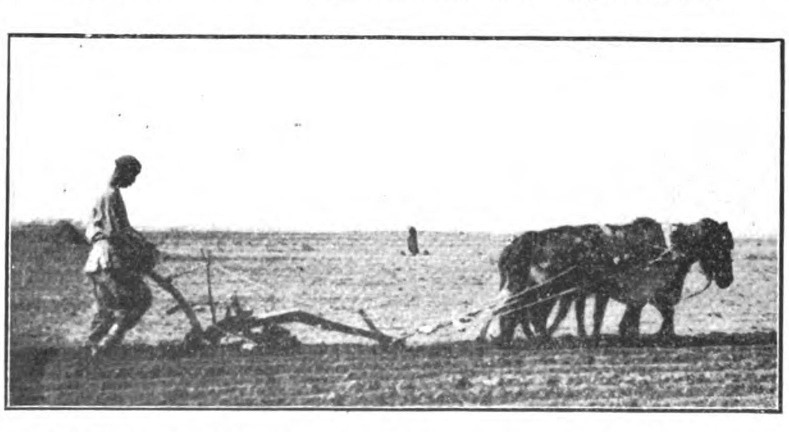
Outside of a few small commission merchants or middlemen there are but three American houses doing business in Manchuria. One of these is engaged wholly in the distribution of kerosene and another in the distribution of sewing machines, and the other is an extensive distributer of cigarettes and candles (British) and to some extent cotton piece goods. This firm has built up a good distributing organization throughout Manchuria, but its efforts are confined chiefly to the three lines mentioned. In comparison, with these we find nine British firms, six Japanese firms (not including the many smaller ones), and three German firms, all substantial concerns, doing business in South Manchuria.

PUBLIC WORKS IN THE PHILIPPINES

(Continued from page 429)

is placed on 18 trucks, of which 17 were specially built by the well-known De Dion Bouton firm for service on the Benguet Road, and one by the same firm for use in Baguio as a bus. These cars have given splendid service, and leave nothing to be desired as passenger carriers. As freighters, however, they only carry 2 tons useful load, the design being limited to this load owing to the fact that at the time the cars were ordered, the weight limit of the bridges on the Benguet Road was 6 tons, and the De Dion, with full load, driver, helpers, equipment, etc., weighed over 5 tons. The weight limit of the Benguet Road bridges has since been increased to 8 tons, and we are now contemplating the purchase of heavier motor trucks along somewhat different lines. During the year, 5,161 tons of 2,000 pounds each were carried under the direction of the automobile line, for the greater part by the De Dion trucks, although a portion by bull carts and mule teams. The total receipts of the line were P.221,000, expenses P.219,000. The expenses include the payment of an 8 per cent. surcharge to the Bureau, but do not include depreciation of rolling stock, buildings, or equipment. It must be remembered that the road was closed to traffic during nearly half the year, and the receipts of the automobile line during that period were very small. The rates charged for passengers, baggage, and freight are much lower than in the days when traffic was handled by mule teams and bullock carts. Our experience in operating the line has shown us where considerable savings can be made in operation, and the coming year we anticipate that there will be a substantial net surplus at the end of the year.

Baguio City Engineer.—In December, 1911, Mr. A. D. Williams, of this Bureau, was detailed as city engineer to Baguio, and has carried on the work to the credit of the Bureau and to the satisfaction of the city authorities.



THE WOODEN PLOW STILL IN GENERAL USE IN MANCHURIA

CHINA AND THE SIX POWER GROUP

FULL TEXT OF THE REORGANISATION LOAN AGREEMENT AND INTER-GROUP AGREEMENT

An entirely new position has been created in regard to the Reorganisation Loan for China by the action of President Woodrow Wilson in declining to request the American Group to continue negotiations. The Presidential announcement was immediately followed by the withdrawal of American participation in the Six Power Group.

The statement made by President Wilson was as follows:—

"The last Administration, desiring to manifest America's goodwill towards China, to open the way for investment of American capital in China and, also, to share equally with other Powers political responsibility which might accompany the development of China's external relations, requested an American group of capitalists to participate in the Reorganisation Loan.

"Now the latter have approached the present Administration, saying if a similar request was made, then, and then only, would the Group continue active participation. The conditions of the Loan, however, include conditions embodying the imposition of antiquated taxes and supervision by foreign advisers. The present Administration regards this as touching the independence of China and does not see the necessity for participation, even though America took no initiation therein.

"Moreover, the responsibility attaching to such a request, in case of eventualities, might lead to the necessity for forcible interference, not only in the financial, but also in the political affairs of China. Such is contrary to American national principles.

"This Administration therefore refused to request the Group to participate in the Loan. The United States Government, however, has no intention of preventing free development of the great Chinese nation. On the contrary it intends to give whatever assistance is possible, so far as is consistent with America's traditional policy.

"The awakening of the Chinese people in respect of liberal Administration is the most significant event of modern times and activities of the Chinese people in that direction have the sincere sympathy of the American people, who desire to participate in China's enormous, almost unrivalled resources for the good of the Chinese people and of the world at large. America is anxious to promote commercial relations between the two Republics and recognises that necessary legislation is lacking to give American residents in China banking facilities, thereby placing Americans in a remarkably unfavourable position compared with their competitors. We are ready to support legislation for laws to amend that defect.

"In short, our interests in China lie in the Open Door, with the object of cultivating friendship and mutual benefit."

What effect the withdrawal of the American Group will have upon the loan negotiations it is impossible to say, as the opinions of those best informed differ widely. Since diplomacy took a hand in the negotiations and business was shouldered out of court by politics no-one but a born prophet could accurately forecast what is going to happen.

The consortium of bankers has done its best to come to business with the Minister of Finance. They, in fact, agreed upon acceptable terms. Then the Diplomats took a hand, and the result has been suspension—animated suspension.

The terms as proposed are so fraught with danger to the present Government if they are accepted that they see wisdom in postponing the whole matter until the new Parliament meets. China has managed to pull through thus far without outside help of any large amount, and the Ministers of the Cabinet feel they might easily hang on a little longer. But any small loans on easy terms will be thankfully received!

It is reasonable to suppose that had the majority of the Diplomats adhered to the terms originally proposed by the Chinese in regard to advisers the loan would now have been signed. They did not, and what China thinks of the matter is set out in a letter given below. It traverses the ground sufficiently to state the Chinese case clearly. It is unnecessary now to labor the question. The Chinese tried to appoint three neutral advisers. The Ministers of the six countries concerned, after much discussion objected, and proposed a Briton for the Salt Gabelle, to be assisted by a German deputy; a German for the Loan department, and a Frenchman and a Russian for the Audit department. The Chinese declare they cannot accept this proposition. Their notification was definite in that direction, but at the same time suggested that the matter might be put before Parliament. Later the Minister of Finance wrote the Group as follows:—

(Letter from H.E. The Hon. Chou Hsueh-hsi to E. G. Hillier, Esq., C.M.G., Senior Representative of the Sextuple Banks.)

PEKING, 11TH MARCH, 1913.

I have the honor to submit the following communication for your consideration:—

For nearly one year past negotiations have been carried on with you with a view to the obtaining of a comprehensive loan for meeting the financial requirements of our country. The terms of the proposed agreement were discussed by the Cabinet, and their essential conditions, so far as they have been arranged, were submitted by me to the National Council and, with the exception of two points—namely, the rate of interest and the price, which I modified on my own responsibility, were approved by the National Council.

From the first it was my wish to contribute in every way to the maintenance of harmonious relations with the Sextuple Banks, and keeping this object in view I have yielded to the terms required by you to the utmost limit, in the hope that success might be attained, complete order in the country restored, essential reorganisation effected and permanent peace assured.

Twice during these negotiations I have been placed in specially serious embarrassment. On the occasion of the end of the Old Year, modern style, and again at the end of the Old Year, old style. On both these occasions obligations had to be met. On the former of these occasions, feeling confident that my action in this emergency would be approved by the National Council I asked the Cabinet to accept the responsibility of agreeing to the rate of interest of 5½% instead of 5% which had been the original basis of our negotiations.

On the 26th of January you wrote to me that "with these exceptions (namely the price of issue of the Loan in London and a verbal alteration in Article 13) the text of the Loan Agreement to be signed is the same as that handed to you under Letter of the 15th of January" and you added that the signature of the Loan Agreement was subject to the fulfilment of the following condition:—

"Notification to us by our respective Ministers of the engagement under suitable contracts of acceptable foreigners for the posts of

Chief Inspector of the Salt Administration.
Adviser to the Accounts and Audit Department.
Director of the National Loans Department."

On receipt of this letter I took the necessary steps to engage three foreigners of high integrity and tried experience to fill the three posts specified. These foreigners I selected by merit not by nationality, after having made thorough enquiry into their merits. I had every reason to believe that the choice met with your approval, but on the 4th of February when the Agreement was ready and when you had already promised to sign it immediately and advance money at once, unexpected obstacles were created and your promise could not be fulfilled.

On the 5th of February I wrote to you informing you that as the Agreement had not been signed I reserved the right to contract other loans elsewhere. You at once replied that "so far as the Groups representatives are concerned, everything is now ready for signature and the delay of which you complained is therefore clearly due to circumstances beyond our control and for which we cannot be held responsible."

On the 6th I again addressed a letter to you stating that I could not be held responsible for matters outside the scope of the Loan Agreement, and that since no Agreement seems possible it was my duty to seek elsewhere for the advances of which we stood in need. Yet still I waited patiently hoping that you might still conceive it reasonable that you should sign the contract which was "ready for signature."

More than a month had passed since the date of signature originally proposed when on March 3rd the intimation was conveyed to my Government that at a meeting of the Six Powers it had been arranged that nationality was to be the determining factor in the engagement of the foreigners provided for in the Loan contract and that an Englishman was to be appointed in the Salt Gabelle, with a German Deputy; that the Director of the National Loans Department was also to be a German: but that in the Accounts and Audit Department there was to be one highly important change. Instead of one foreigner there were to be two—a Frenchman and a Russian. Such serious alterations were never contemplated or suggested in all the course of the negotiations.

First by a succession of unreasonable delays and secondly by the altered conditions required for the fulfilment of the Loan contract, I have been involved in difficulties which I have never contemplated as possible. China has been assailed in the European papers. We are charged with failing to fulfil our financial obligations by the very Powers whose action has prevented us from fulfilling our obligations. We are upbraided for not more rapidly reorganising our administration by the very Powers whose action has prevented us from obtaining the requisite means for reorganisation.

The administration of my country has suffered serious injury through this delay and further postponement has become most difficult.

I cordially thank you for the constant courtesy you have shown me throughout these protracted negotiations and I deeply regret that unforeseen circumstances have prevented the signature and realisation of the contract when "ready for signature," circumstances which, as you stated in your letter of the 5th of February, are beyond your control and for which you cannot be held responsible.

I respectfully send you this communication for your consideration.

(The following was the reply of the Bankers sent to the Minister of Finance by Mr. Hillier, Manager of the Hongkong and Shanghai Banking Corporation):—

Hongkong and Shanghai Bank,
Peking, March 14th, 1913.

The Hon. Chou Hsueh-hsi,
Minister of Finance.

Sir:—

I have the honor to acknowledge in the name of my colleagues and myself the receipt of your letter of the 11th of March referring to the loan negotiations of the past few months.

Without discussing at present that portion of your letter dealing with the circumstances which up to this time have prevented the conclusion of the loan agreement we desire to express to you our sincere appreciation of the friendly terms in which you refer to the efforts of our Groups to consummate an agreement satisfactory to the Chinese Government, and we venture to entertain the hope that it may yet be found possible to achieve this happy result at an early date.

I have the honor to be, Sir,
Your obedient servant,
(*Signed*) G. S. Hillier.

The full text of the Agreements which were to have been signed in February, and the Agreement between the Groups follow:—

THE REORGANISATION LOAN AGREEMENT

This Agreement, made at Peking on the......day of 1913 between the Government of the Republic of China (hereinafter called "The Chinese Government"), acting through its Premier, its Minister of Foreign Affairs and its Minister of Finance, of the one part and

The Hongkong and Shanghai Banking Corporation,
The Deutsch-Asiatische Bank,

Messrs. J. M. Morgan and Company, Messrs. Kuhn Loeb and Company, the First National Bank and the National City Bank, all of New York, constituting "The American Group."

The Russo-Asiatic Bank, and

The Yokohama Specie Bank, Limited

(Hereinafter collectively called "The Banks") of the other part,

Witnesseth:—Whereas the Chinese Government desire to borrow the sum of Twenty-Five Million Pounds Sterling (£25,000,000) equal to 511,250,000 Marks, 631,250,000 Francs, 121,625,000 U.S. Gold Dollars, 236,750,000 Roubles 244,900,000 Yen, for general reorganisation and adminstrative purposes (hereinafter to be specified) and proposes to evidence the above loan by the issue of its gold bonds for the principal amount above-named, and whereas the Banks are prepared to issue to the public on behalf of the Chinese Government the bonds of the above-named Loan, Therefore it is Agreed as Follows:—

ARTICLE I

The Chinese Government hereby authorizes the Banks to issue either in one amount or in series, at their option, five and one-half per cent. (5½%) gold bonds, to an aggregate amount of £25,000,000 equal to 511,250,000 Marks, 631,250,000 Francs, 121,625,000 U.S. Gold Dollars, 236,750,000 Roubles, 244,900,000 Yen.

The banks have the option to pay the whole or any portion of the proceeds of the loan to the Chinese Government in Pounds Sterling or the equivalent at the above parities in the currencies of the various countries in which the subscriptions have been made. The coupons attached to the preliminary certificates and to the definite bonds shall be payable in the various countries at the above parities. The definite bonds shall be subject to the same conditions when drawn, converted, redeemed or paid.

The loan shall be of the date of the first issue of bonds, and shall be entitled "The Chinese Government Five and One-half per cent. Reorganisation Gold Loan.".

ARTICLE II

Subject to the provision in Article XIII hereinafter for the payment of the first coupon, the net proceeds of the loan shall be used solely for the following purposes:—

(*a*) Payment of liabilities due by the Chinese Government as detailed in Annex A to this Agreement.

(*b*) Redemption in full of outstanding provincial loans as detailed in Annex B to this Agreement.

(*c*) Provisions for payment at due date of liabilities of the Chinese Government shortly maturing as shown in Annex C to this Agreement, including provision for foreign claims for damage and losses arising out of the Revolution.

(*d*) Disbandment of troops as detailed in Annex D to this Agreement.

(*e*) Current expenses of administration as estimated in Annex E to this Agreement.

(*f*) Reorganisation of the Salt Administration as set forth in Annex F to this Agreement.

(*g*) Such other administrative purposes as may be mutually agreed upon between the Chinese Government and the Banks.

The aforesaid Annexes form part of this present Agreement.

ARTICLE III

This entire loan and all advances which may be made in connection therewith are hereby constituted a direct liability and obligation of the Chinese Government, which hereby pledges its good faith and credit for the punctual payment of the principal and interest of the loan, and (or) advances and for the performance of all the undertakings on its part herein assumed.

ARTICLE IV

This entire loan together with any advance which may be made in connection therewith, is hereby secured in respect to both principal and interest by a charge upon the entire revenues of the Salt Administration of China, subject to previous loans and obligations already charged on the security thereof and not yet redeemed, as detailed in the statement attached to this Agreement, and it shall have priority both as regards principal and interest over all future loan, charges and mortgages charged upon the above-mentioned revenues so long as this loan or any part thereof shall be unredeemed. No loan, charge or mortgage shall be raised or created which shall take precedence of or be on an equality with this loan, or which shall in any manner lessen or impair its security over the said revenues of the Salt Aministration of China, so far as required for the annual service of this loan, and any future loan, charge or mortgage charged on the said revenues of the Salt Administration shall be made subject to this loan, and it shall be so expressed in every agreement for any such future loan, charge or mortgage.

If at any future time the annual collection of the Maritimes Customs revenues should exceed the amount necessary to provide for all existing obligations charged thereon or which may have become chargeable thereon by reason of the abolition of likin consequent upon tariff revision, it is understood and agreed that such surplus shall be applied in the first instance to the security and service of this loan, the surplus of the salt revenues being thereby *pro tanto* increased and made available for the general purposes of the Chinese Government.

ARTICLE V

The Chinese Government engages to take immediate steps for the reorganisation with foreign assistance of the system of collection of the salt revenues of China assigned as security for this loan, in the manner which has been determined upon by the Ministry of Finance and which is as follows:—

The Chinese Government will establish a central Salt Administration (Yen Wu Shu) at Peking under the control of the Minister of Finance. This Central Salt Administration will comprise a Chief Inspectorate of Salt Revenues (Chi Ho Tsung So) under a Chinese Chief Inspector (Tsung Pan) and a foreign Associate Chief (Hui Pan) who will constitute the chief authority for the superintendence of the issue of licenses and the compilation of reports and returns of revenues. In each salt-producing district there will be a branch office of the Chief Inspectorate (Chi ho Fen So), under one Chinese and one foreign District Inspector (So Chang), who shall be jointly responsible for the collection and the deposit of the salt revenues. The engagement and dismissal of these Chinese and Foreign District Inspectors and of the necessary foreign staff at the Chief and Branch Inspectorates will be decided jointly by the Chinese and Foreign Chief Inspectors, with the approval of the Minister of Finance. It will be the duty of the District Inspectors jointly to superintend the issues of licenses and to report all receipts and disbursements in full detail to the local Salt Commissioner (Yen yun ssu) and the Chief Inspectorate in Peking, which shall publish periodical reports of the same after submission to the Minister of Finance.

Release of salt against payment of dues in any district will be made only under joint signature of the Chinese and Foreign District Inspectors, the revenues so collected to be lodged by them in a "Chinese government salt revenue account" with the banks or with depositories approved by the banks and reported to the Chief Inspectorate for comparison with their returns. This Salt Revenue Account shall be drawn upon only under the joint signatures of the Chief Inspectors whose duty it will be to protect the priority of the several obligations secured upon the salt revenues.

So long as the interest and principal of this loan are regularly paid there shall be no interference with the Salt Administration as herein provided, but if interest and/or principal be in default at due date then after a reasonable period of grace the said organisation shall forthwith be incorporated with the Maritime Customs and the revenues above pledged shall be administered for the account and in the interest of the bondholders.

ARTICLE VI

Pending the reorganisation of the Salt Administration and commencing with the first month from the date of this loan, the provinces of Chihli, Shantung, Honan and Kiangsu shall pay monthly into the banks the funds necessary to meet the service of this loan in accordance with the amounts stated in the schedule attached to this agreement and fourteen days before the due date of each such amount. The payment of these amounts by the provinces named is hereby secured by a first charge upon Central Government taxes of the respective provinces to be assigned, and the Chinese Government engages to supply the banks with evidence that the obligations under this agreement of the provinces named are officially recognised by the proper authorities of the said provinces.

So soon as the revenue collection of the Salt Administration over a period of one year shall be sufficient to cover the service of all loans and obligations now secured thereon, including that of this present loan, together with a margin sufficient to cover a further half yearly interest coupon of the latter, the said monthly contributions from the provinces shall be suspended, and the service of this loan shall then be paid from the revenues of the Salt Administration. So soon as the revenues of the Salt Administration shall have been maintained for three successive years at the figure above determined, the aforesaid provincial liability shall be finally released.

ARTICLE VII

The banks are hereby authorised to issue to subscribers to the loan gold bonds for the total amount of the loan in such denominations and for such amounts as shall be determined by the banks. The form and language of the bonds shall be settled by the banks in consultation with the Ministry of Finance or with the Chinese Ministers in London, Paris, Berlin, Washington, St. Petersburg, and Tokio.

The bonds shall be printed and/or engraved by the banks at the expense of the Chinese Government and shall bear the facsimile of the signature of the Minister of Finance, in order to dispense with the necessity of his signing them all in person, and of the seal of the Chinese Government. The Chinese Minister in London and/or Berlin, and/or Paris, and/or Washington, and/or St. Petersburg, and/or Tokio at the option of the banks shall previous to the issue of the bonds authenticate them with a facsimile of his signature and of his seal as a proof that the issue and sale of the bonds are duly authorised by and binding upon the Chinese Government. Representatives of the banks in London, Berlin, Paris, New York, St. Petersburg or Yokohama, as the case may be, may countersign the bonds as agents for the issue of the loan.

ARTICLE VIII

The rate of interest for the loan shall be 5½% five and one half per cent. per annum on the nominal principal and shall be paid by the Chinese government to the bondholders half-yearly through the banks or their designated agents, upon presentation of the proper coupons. Coupons shall be payable in pounds sterling or the equivalent in marks, francs, United States gold dollars, roubles and yen as provided in Article I. The said interest shall be calculated from the date on which the bonds are issued.

ARTICLE IX

The term of the loan shall be fifty years (50). Repayments of principal shall commence with the sixteenth year, and shall be made by yearly sinking fund of 997,493% equal to £249,373-5-0, equivalent to 5,099,682.96 marks, 6,296,674.56 francs, 1,213,200.96 U.S. gold dollars, 2,361,564.68 roubles, 2,442,860.36 yen, which shall be paid by the Chinese government to the banks in monthly instalments in accordance with the amounts stated in the schedule attached to this agreement and fourteen days before the due date of each such amount.

If at any time after the lapse of fifteen years from the date of the loan the Chinese Government should desire to redeem at par or convert the outstanding amount of the loan, it may do so, by giving in writing six months' previous notice to the banks,

and/or such redemption and/or conversion shall be effected on the date of an ordinary drawing as provided for in the prospectus of the loan, unless otherwise arranged with the Banks.

When the loan has been fully repaid this Agreement will immediately become null and void.

ARTICLE X

Payments by the Chinese Government for interest and amortization shall be made monthly in accordance with the amounts stated in the schedule attached to this Agreement, and fourteen days before the due date of each such amount in equal shares to the Banks by the Ministry of Finance which shall hand to the banks or their agents as may be from time to time respectively designated, the International Banking Corporation being now so designated by the American Group, in Shanghai, funds in Shanghai sycee and/or coin of the national currency, so soon as the said currency shall have been effectively established, sufficient to meet each such payment in gold in Europe, in the United States of America, and/or in Japan, exchange for which shall be settled with the banks on the same day. These payments may, however, be made in gold in Europe, in the United States of America, and/or Japan, fourteen days before their due dates, if the Government should happen to have gold funds *bona fide* at its disposal in Europe, in the United States of America, and/or Japan, not remitted from China for the purpose, and should desire so to use them. Interest upon the said monthly instalment until required for the service of the loan to the bondholders shall be allowed by the Banks, to the Chinese Government at the rate of 2% per annum.

In reimbursement of expenses connected with the payment of interest and with the repayment of principal of the loan the Banks are hereby granted by the Chinese Government a Commission of one-fourth per cent. (¼%) on the annual loan service, the said commission to be paid half yearly to the Banks as provided in the Schedule attached to this Agreement.

ARTICLE XI

All details necessary for the prospectus of the loan, and in connection with the payment of interest and the repayment of principal of the loan and with the withdrawing of bonds for redemption not herein explicitly provided for, shall be left for arrangement by the Banks in consultation with the Chinese Minister in London, Berlin, Paris, Washington, St. Petersburg and/or Tokio.

The banks are hereby authorized to issue the prospectus of the loan as soon as possible after the signing of this Agreement, and the Chinese Government will instruct the Chinese Ministers in the various Capitals named above to co-operate with the Banks in any matters requiring conjoint action and to sign when requested the prospectus of the loan.

ARTICLE XII

All bonds, coupons, and payments made and received in connection with the service of this loan shall be exempt from all Chinese taxes and imposts during the currency of this loan.

ARTICLE XIII

The price of this present loan or of any series thereof to the Chinese Government shall be the price of its issue to the public less a deduction by the Banks of six per cent. (6%) of the nominal value of the bonds. The issue price in London to be not less than ninety-six and one half per cent. (96½%) securing to China a net price of not less than 90½% for the entire loan. The Banks shall be responsible for all expenses connected with the issue of the loan except the printing and/or engraving of the bonds.

It shall be left to the Banks to determine the most favorable moment for issue, and the Minister of Finance shall be notified in advance in order that the necessary instructions may be given to the Chinese Ministers abroad.

The Banks shall retain on deposit in Europe, America, and/or Japan from the first proceeds of the loan a sufficient amount to meet the first half-yearly interest coupon and the Banks commission of ¼% thereon, and the Chinese Government hereby authorizes the Banks to pay the said interest coupon and commission from the funds so retained. At the same time, the funds to be paid by the Provinces into the Banks in China for service of the loan as provided in Article VI of this Agreement shall accumulate during the six months covered by the first coupon, and shall be held as a reserve fund to provide against any possible interruption of such payment by the Provinces, until the suspension of the latter taxes takes place under the provisions of the said Article.

After deduction from the proceeds of the loan of an amount sufficient for the payment of the first coupon and for the repayment of accrued interest of any advances made by the Banks on account of this loan, and after provision has been made for items, *a*, *b*, and *c*, in terms of Article II of this Agreement, the balance of the net proceeds of the loan shall be placed to the credit of a "Chinese Government Reorganisation Loan Account" with the Hongkong and Shanghai Banking Corporation, the Deutsch-Asiatische Bank, the Banque de l'Indo-Chine, the American Group, the Russo-Asiatic Bank and the Yokohama Specie Bank, Limited, in London, Berlin, Paris, New York, St. Petersburg and Yokohama, as the case may be, in instalments and on dates conforming to the conditions allowed by the prospectus to the subscribers to the Loan.

Transfers of loan funds to China from the Banks in Europe, America and Japan, shall be made through the Banks in China or their designated agents as nearly as possible in equal amounts from each of the Banks, the rates of exchange for each transfer from Europe, America or Japan being settled simultaneously with the transferring Banks on the same day. In the event of equal transfers being found to be impracticable, a mutually satisfactory procedure for making the transfers above referred to shall be arranged between the Minister of Finance and/or the Banks.

Interest at the rate of three (3) per cent. per annum shall be granted on the balance of loan funds held in London, Berlin, Paris, New York, St. Petersburg or Yokohama: interest on the credit portion of the loan funds kept in China by the transferring Banks will be allowed at the Banks' rate for current accounts to be arranged.

Withdrawals of that portion of the loan proceeds held in the aforesaid Chinese Government Reorganisation Loan Account in Europe, America or Japan shall be at the order of the Ministry of Finance subject to the provisions of Article XIV hereinafter. Transfers of loan funds to China in any one week shall be made in amounts to be arranged from time to time with the banks or their designated agents but shall not exceed £500,000 in any one week, and funds so transferred shall be held by the transferring Banks in China until required for the purposes for which the loan is made, and withdrawn as hereinafter provided in Article XIV.

ARTICLE XIV

The Chinese Government engages at once to put into effective operation an Accounts and Audit Department, under the provisional Regulations Promulgated by a Presidential Order dated the 15th of November 1912, and published in the Official Gazette of November 16th, 1912, copy and translation of which are hereto attached in Annex G of this Agreement, subject to the understanding that any modification which may be found necessary shall not impair their effect in regard to this loan.

The Chinese and Foreign Directors of the Bureau of National Loan shall witness their approval of all requisitions for loan funds by their joint signatures thereon. Withdrawals of loan funds from the Banks shall be for amounts corresponding to the actual requirements of disbursements.

Cheques and/or orders upon the Banks for the withdrawal of loan funds shall be signed by a duly authorised representative of the Minister of Finance and shall be sent together with the supporting requisitions duly signed as above, and the relative "orders to pay" (fa-k'uan ming-ling) to a representative of the Banks to be designated. The said representative of the Banks after satisfying himself that the expenditure is in accordance with

Article II of this agreement and the Annexes therein referred to, shall forthwith countersign the cheque and return it to the Ministry of Finance for presentation to, and payment by, the Banks.

Should the said representative of the Banks be in doubt in respect to disbursements of loan funds which have been made, he shall be entitled to make enquiries of the Foreign Director of the Bureau of National Loans and to call upon him for the production of receipts and vouchers for inspection.

ARTICLE XV

In the event of any bond or bonds issued for this loan being lost, stolen or destroyed, the Bank or Banks concerned may notify the Board of Finance and the Chinese Ministers in London, Berlin, Paris, Washington, St. Petersburg or Tokio, as the case may be, who shall authorize the Bank or Banks concerned to insert an advertisement in the public newspapers stating that payment of such bond or bonds has been stopped: and to take such other steps as may appear advisable or necessary according to the laws or customs of the country concerned. Should any bond or bonds be destroyed, or should such lost or stolen bond or bonds not be recovered after a lapse of time to be fixed by the banks, the Chinese Ministers in London, Berlin, Paris, Washington, St. Petersburg or Tokio, as the case may be, shall execute a duplicate bond or duplicate bonds for a like amount and deliver the same to the Banks representing the owner or owners of such lost, stolen, or destroyed bond or bonds, which Bank or Banks shall pay all expenses in connection with such delivery and execution of such duplicate bond or bonds for the account of the owner or owners of such bond or bonds.

ARTICLE XVI

If before the publication of the prospectus for the issue of this loan, any political or financial crisis should occur affecting the money markets or the prices of Chinese Government securities in such manner or to such degree as in the opinion of the Banks will render impossible the successful flotation and issue of this loan on the terms herein named the Banks shall be granted a period of six months from the date on which this Agreement shall be signed, within which to issue the loan to the public. If on the expiration of this period, the markets are still unfavorable, then the Banks shall be entitled to ask the Chinese Government for extension of time. If the Chinese Government should refuse to grant the extension of time requested, this contract shall become null and void, subject always to the repayment to the Banks with accrued interest of any advances which may have been made by them on account of this loan. If this loan shall be issued in series under Article I hereof, the provisions of this clause shall, ***mutatis mutandis***, apply to the issue of each series of the loan.

ARTICLE XVII

In the event of the Chinese Government desiring to issue further loans secured upon the revenues of the Salt Administration or to issue supplementary loans for purposes of the nature of those specified in Article II of this Agreement, the Chinese Government will give to the Banks the option of undertaking such loans on a commission basis of 6% of the nominal value of the bonds, as provided in Article XIII of this Agreement.

The Chinese Government further undertake that for a period of six months after the complete issue of this present loan and payment of the last instalment thereof in terms of the prospectus, it will not proceed to the issue of any other Government loan or loans having a Government guarantee concluded later than December 1st, 1912, without the previous agreement of the Banks.

ARTICLE XVIII

The Hongkong and Shanghai Banking Corporation, the Deutsch-Asiatische Bank, the Banque de l'Indo-Chine, "The American Group," the Russo-Asiatic Bank and the Yokohama Specie Bank, Limited, shall take the loan in equal shares, and without responsibility for each other.

ARTICLE XIX

The Hongkong and Shanghai Banking Corporation, the Deutsch-Asiatische Bank, the Banque de l'Indo-Chine, "The American Group," the Russo-Asiatic Bank and the Yokohama Specie Bank, Limited, may, subject to all their obligations under this agreement, transfer or delegate all or any of their rights, powers and discretions thereunder to any British, German, French, American, Russian or Japanese Company, Directors or Agents with power of further transfer and sub-delegation, such transfer, sub-transfer, delegation or sub-delegation to be subject, however, to the approval of the Chinese Government.

ARTICLE XX

This Agreement is signed on behalf of the Chinese Government by the Premier, the Minister of Foreign Affairs and the Minister of Finance under authority of a Presidential Order dated the day of , 1913, which has been officially communicated to the Ministers in Peking of Great Britain, Germany, France, United States of America, Russia and Japan, by the Wai Chiao Pu.

ARTICLE XXI

Nine sets of this Agreement are executed in English and Chinese, three sets to be retained by the Chinese Government, and six sets by the Banks. In the event of any doubt arising regarding the interpretation of the Agreement, the English text shall rule.

Signed at Peking this day of , 1913.

THE INTER-GROUP AGREEMENT

Agreement made the eighteenth day of June, 1912, between the Hongkong and Shanghai Banking Corporation, having its office at 31 Lombard Street, in the city of London (hereinafter called the "Hongkong Bank"), of the ***first*** part, the Deutsch-Asiatische Bank, having its office at 31 Unter den Linden, Berlin (hereinafter called the "German Bank"), of the ***second*** part, the Banque de l'Indo-Chine, having its office at 15 bis Rue Laffitte, Paris (hereinafter called the "French Bank"), of the ***third*** part, Messrs. J. P. Morgan and Co., Messrs. Kuhn Loeb & Co., the First National Bank, and the National City Bank, all of New York (hereinafter called "The American Group"), acting as to the United Kingdom by Messrs. Morgan Grenfell and Co., of 22 Old Broad Street, in the city of London, as to Germany by Messrs. M. M. Warburg & Co., of Hamburg, and as to France, by Messrs. Morgan Hayes & Co., of Paris, and Messrs. M. M. Warburg & Co (all hereinafter called the "American Agents"), of the ***fourth*** part; the Russo-Asiatic Bank, having its office at 62 Nevsky Prospect, St. Petersburg, Russia (hereinafter called the "Russian Bank"), of the ***fifth*** part, and the Yokohama Specie Bank, Ltd., having its office at Yokohama, in Japan (hereinafter called the "Japanese Bank"), of the ***sixth*** part.

Whereas negotiations have for some time past been carried on between the first four parties hereto and the Chinese Government with a view to the issue by such first four parties of a Government reorganisation loan for £60,000,000, or thereabouts, and Whereas the first four parties thereto have already made to or on account of the Chinese Government certain preliminary advances, and Whereas it has been agreed that the Russian Bank and the Japanese Bank shall participate on an equal footing with the first four parties thereto in the reorganisation loan which shall be deemed to include the said preliminary advances which have already been made by the first four parties hereto and any further preliminary advances which shall be made by the parties hereto,

Now It Is Hereby Agreed by and between the parties hereto as follows:—

1.—In the matter of this Agreement the German Bank is acting on behalf of the German Syndicate for Chinese business consisting of the parties whose names are set forth in the first schedule hereto and the French Bank is acting on behalf of the French Syndicate for Chinese business consisting of the parties

whose names are set forth in the Second Schedule hereto and the American agents are acting on behalf of the American Group, the Russian Bank is acting on behalf of the Russian Syndicate for Chinese business consisting of the parties whose names are set forth in the third schedule hereto. The French Bank, the German Bank, the American Group and the Russian Group reserve to themselves respectively the right of increasing or reducing in each special case the number of parties interested in the French and German syndicates, the American Group and the Russian syndicate respectively and a similar right is reserved to the Hongkong and to the Japanese Bank respectively but so that any party dropping out shall remain bound by the restrictive provisions hereof and any party coming in shall become subject to the restrictive provisions hereof and so that hereafter none of the parties hereto shall (without the consent of the others) be entitled to admit into its group a new member who is not of its nationality and domiciled in its market.

2.—This Agreement relates to the reorganisation loan and to the future business hereinafter in this clause mentioned and is made on the principle of complete equality in every respect between the parties hereto, and each of the parties hereto shall take an equal share in all operations and jointly sign all contracts and shall bear in equal shares all charges in connection with any business (except stamp duties and any charges of and in connection with the realisation by each of the parties hereto in their respective markets of its share in the operation), and each of the parties hereto shall conclude all contracts with equal rights and obligations as between themselves and each party shall have the same rights, privileges, prerogatives, advantages, responsibilities and obligations of every sort and kind. The said preliminary advances shall accordingly be borne by each of the parties hereto in equal shares and any sums which may have already been paid by the first four parties hereto in respect of preliminary advances or otherwise in connection with the said reorganisation loan shall as soon as may be after the execution hereof be adjusted on the above-mentioned basis of equality. Until the reorganisation loan shall have been issued or until a majority of the parties hereto may have decided not to proceed further with the issue thereof or until a period of five years from the date hereof shall have elapsed whichever event shall first happen, each of the parties hereto shall offer to the other parties an equal participation with itself in any loan or advance business into which it may after the date of this agreement enter with the Chinese Government or with any of the provinces forming part of China or with Chinese Government departments or with Companies having Chinese Government or provincial Government guarantees, it being understood that there are excepted from this provision (1) current banking business as well as small financial operations coming within the scope of the same, and (2) loans or advances to Companies having Chinese Government or Provincial Government guarantees, provided that such loans or advances do not involve an issue during the currency of this agreement to the public of bonds or other securities. Should one or more of the parties hereto decline a participation in any such future loan or advance business as aforesaid or in the reorganisation loan or any part thereof, the party or parties accepting the participation therein shall be free to undertake the same but shall issue on its or their markets only. Where one or more of the parties should have accepted a participation in any such future loan or advance business notifies the other parties who have also accepted a participation of its intention, not to issue its or their participation, the party or parties to whom such notice shall be addressed will issue the participation of the party or parties giving such notice upon the same terms and conditions ***mutatis mutandis*** as are hereinafter contained with regard to the residuary participation in the reorganisation loan.

3.—All contracts shall so far as possible be made so as not to impose joint liability on the parties hereto but each of the parties hereto shall severally liquidate its own engagements or liabilities towards the Chinese Government. The parties hereto will so far as possible come to an understanding with regard to the realisation of the operations, but so that such realisation in whatever manner this may take place shall be for the separate benefit of each of the parties hereto as regards their respective participations therein and so that each of the parties hereto shall be entitled to realise its participation in the operation only in its own market, it being understood that the issue in the respective markets are to be made at substantial parity. For the purpose of this Agreement, the Belgian market shall be considered as part of the market of the Russian Bank, subject only to this restriction:— viz., that the Russian Bank shall not issue in Belgium more than one-third of its participation and only by one or more of the personal members of its group. Notwithstanding the provisions of this clause, each party reserves to itself the right to share its operations (other than easy operations) with the present members of its own group irrespective of their nationality.

4.—Any one or more of the parties hereto who shall have accepted its or their participation in the reorganisation loan or any part of such loan shall be entitled by notice in writing to call upon the other or others of the party hereto who propose to issue their own respective parts to issue for the account of the party or parties giving such notice or notices, either all or one half of the amount which may constitute the participation in the Reorganisation Loan or any such part thereof as the parties hereto may from time to time agree to issue to the party or parties giving such notice or notices and the party or parties so called upon shall issue the said amount or amounts (hereinafter called "The Residuary Participation") specified in such notice or notices upon and subject to the terms and conditions following, viz.:—

(1.)—Such notice or notices must be received by the other or others of the parties hereto before the execution of the final Agreement with the Chinese Government for the issue of the Loan or (in the case of an issue of a part only of the loan) of so much the parties hereto may from time to time agree to issue.

(2).—The party or parties to whom such notice or notices shall have been given shall be entitled to decide among themselves and without reference to the party or parties giving such notice or notices as to which one or more of them shall issue the "Residuary Participation," but in default of any such decision, they shall issue the same equally between them.

(3).—In issuing the "Residuary Participation," no distinction shall be made between the "Residuary Participation" and the amount or amounts issued on its or their own account by the banks issuing the "Residuary Participation," which shall in all respects be subject to the conditions of the respective syndicates which may be formed for the purpose of effecting this issue.

(4).—Each of the banks issuing the "Residuary Participation" shall be entitled to decide for itself and without reference to the party or parties giving such notice or notices as to what expenses shall be incurred in relation to the issue of the total amount issued by such bank.

(5).—The banks issuing the "Residuary Participation" shall be entitled between them to charge the party or parties giving such notice or notices with a commission not exceeding one and one-half per cent. (1½%) of the nominal amount of the "Residuary Participation" and also a *pro rata* share of the total expenses which such banks may in their sole discretion incur in relation to the whole issue and being in the proportion which the "Residuary Participation" bears to the total nominal amount of the issue.

(6).—The bank or banks issuing the "Residuary Participation" shall not by virtue of this Agreement incur any responsibility to subscribe for the "Residuary Participation" or to cause the same to be subscribed.

(7).—Each bank issuing the Residuary Participation shall apply all subscriptions received by itself *pro rata* between the Residuary Participation issued by it and the amount issued by such bank on its own account.

(8).—Each of the banks issuing a Residuary Participation will apply for and use its best endeavors to obtain a quotation on its market for the total amount issued by it.

(9).—No issue of the Residuary Participation or any part thereof shall be made by the party or parties giving such notice or notices unless mutually agreed by the parties hereto.

5.—No participation shall be given by any one of the parties hereto outside its own market except to the present members of its own group. Any participation given in its own market by any of the parties hereto shall be for its own account only or in the event of the issue including any of the Residuary Participation for the account *pro rata* of the issuing bank and the party or parties giving such notice or notices as aforesaid and giving any such participation the party giving the same shall use its best endeavors to secure that no part of such participation shall be transferred to parties outside the market of the party giving the same. Any other participations shall be given only with the consent of all parties hereto and shall be borne in equal shares by the parties hereto.

IN WITNESS WHEREOF, the duly authorised representatives of the respective parties hereto have set their hands the day and year first above written.

First Schedule

Direction der Disconto-Gesellschaft, Berlin; S. Bleichroder, Berlin; Deutsche Bank, Berliner Handels-Gesellschaft, Berlin; Bank fuer Handel & Industric; Mendelssohn & Co., Dresdner Bank, A Schaffhausen Scher; Bankverein Nationalbank fuer Deutschland; Deutsch-Asiatische Bank, Shanghai; Jacob, SH. Stern, Frankfurt A/M; Sal Oppenheim, Jr. & Cie, Koln; Norddeutsche Bank in Hamburg, Hamburg; L Behrens & Sohne, Hamburg; Bayerische Hypotheken-und Wechselbank, Muenchen.

Second Schedule

Banque de l'Indo-Chine, Paris; Banque de Paris et des Pays-bas, Paris; Comptoir National d'Escompte de Paris, Paris; Credit Lyonnais; Société Generale pour favoriser le developpement du Commerce et l'Industrie en France, Paris; Société Generale de Credit Industrial & Commercial, Paris; Banque de l'Union Parisienne, Paris; Banque Française pour le Commerce et l'Industrie, Paris; Credit Mobilier Français, Paris.

Third Schedule

Banque Russo-Asiatique; A. Spitzer & Co.; J. Henry Schroeter & Co.; Eastern Bank, Limited; Banque Sino-Belge; Société Belge d'Etude de Chemin de fer en Chine; Société Generale de Belgique; Banque d'Outremer.

(*Signed*)

For the Hongkong & Shanghai Banking Corporation, C. S. Addis; For the Deutsch-Asiatische Bank, Ur'big Rehders; For Banque de l'Indo-Chine, Ullmann, St. Simon; For the American Group, H. P. Davison, Mortimer L. Schiff; For the Russo-Asiatic Bank, M. Verstraete; For the Yokohama Specie Bank, Limited, E. Takeuchi.

AGREEMENT FOR ADVANCES

THIS AGREEMENT, for advances on account of the "Chinese Government Five and a Half per cent. Reorganization Gold Loan," of £25,000,000 is made between the Government of the Republic of China (hereinafter called "The Chinese Government") acting through its Minister of Foreign Affairs, and its Minister of Finance of the one part and

The Hongkong and Shanghai Banking Corporation.

The Deutsch-Asiatische Bank

The Banque de l'Indo-Chine.

Messrs. J. P. Morgan and Company, Messrs. Kuhn, Loeb and Company, The First National Bank, and the National City Bank, all of New York, constituting:

The American Group.

The Russo-Asiatic Bank, and

The Yokohama Specie Bank, Limited (hereinafter collectively called "The Banks,") of the other part,

WHEREAS the above contracting parties have this day entered into an Agreement for a "Chinese Government Five and one Half per cent. Reorganization Gold Loan" of £25,000,000 and it has been agreed that the said loan shall be issued to the public as soon as possible at a price of not less the ninety-six and one-half per cent. (96½%) of the nominal value of the Bonds, and

WHEREAS the Chinese Government is in urgent need of funds for the disbandment of troops and other administrative purposes pending the issue of the said loan to the public it is hereby agreed as follows:—

ARTICLE I

The Banks hereby agree to advance immediately upon the signature of this agreement the equivalent of £2,000,000 sterling as follows: £333,333,6.8; Marks 6,816,666.66; Francs 8,416,-666,66; Gold Dollars 1,621,666.66; Roubles 3,156,666.66; Yen 3,265,333.33 to be held at the disposal of the Minister of Finance in London, Berlin, Paris, New York, St. Petersburg and Yokohama respectively. The Chinese Government undertakes, if and when requested by the Banks, to evidence the said advances by the issue of Treasury Bills in the respective Currencies to be handed to the Banks.

ARTICLE II

Interest on the said advances of the aggregate equivalent of £2,000,000 shall be at the rate of 7% per annum calculated from the date of this agreement and payable half-yearly, and the principal with accrued interest shall be repaid from the first proceeds of the said "Chinese Government Five and one Half per cent Reorganization Gold Loan" of £25,000,000 when issued, or in any case shall be repaid to the Banks by the Chinese Government within twelve months from the date of this agreement.

ARTICLE III

These present advances for the aggregate equivalent of £2,000,000 constitute a direct liability and obligation of the Chinese Government and are secured in respect to both principal and interest by the charge upon the entire revenues of the Salt Administration of China, in terms of Article III and IV of the said Reorganization Loan Agreement.

ARTICLE IV

The said advances shall be used solely for the purposes specified in, and shall be treated as for account of, Annexes D and E to the said Reorganization Loan Agreement; their disbursement shall be carried out in accordance with the provisions of Article XIV of that Agreement.

Arrangement will be made between the Minister of Finance and the Banks for the transfer of the said advances to China and the payment of the silver equivalent at the places where required.

ARTICLE V.

In the event of an early issue of the said Reorganization Loan being found impracticable, rendering further advances necessary during the months of February and March, the Banks undertake, should circumstances admit, to furnish further advances not exceeding the aggregate equivalent of £2,000,000, within the month of February and of £3,000,000 within the month of March, to be covered by similar agreements.

ARTICLE VI

The terms of this Agreement shall be officially communicated by the Wai Chiao Pu to the Ministers of Great Britain, Germany, France, United States of America, Russia and Japan in Peking.

ARTICLE VII

Nine sets of this Agreement are executed in English and Chinese, three sets to be retained by the Chinese Government and six sets by the Banks. In the event of any doubt regarding the interpretation of this agreement the English text shall rule.

Signed at Peking by the contracting parties this day of February, 1913.

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RAILWAY BOOM IN CHINA

Readers of the FAR EASTERN REVIEW cannot fail to have been impressed by the great wave of enthusiasm for railway construction that has of late been rolling round the provinces of China. This issue alone affords significant evidence of the awakening of the people to the need of new lines of communication. There is in all quarters a spirit of inquiry abroad. This is in marked contrast with the attitude of opposition adopted on all sides but a year ago to projects having for their object the opening of the country by railways. The revolution would seem to have wrought the change. It may or it may not have done so. What is certain, though, is that the prime mover of the agitation which led to the revolution has done more than any other person in the country to dispel the popular prejudices which militated against progress in railway development. Dr. Sun Yat-sen, by his campaign in the various sections of the country which he has visited, has opened the eyes of the people to the fact that in easy communication is the secret of strength and independence. His forceful speeches from Canton in the south to Kalgan in the north have worked a marvellous change in public opinion. For that Dr. Sun must receive every credit. To him is due the startling conversion of the country people; to him is due the stir among the gentry who now exhibit so much keenness for the commencement of railway construction in various centres. New lines are being projected all over the country, and some of them will materialise. Others will necessarily remain on paper. The stumbling block to realisation of many of the schemes is, of course, finance. The unfortunate circumstances which have arisen to prevent the Central Government acquiring the funds needed to place the treasury upon a sound basis is also preventing the development of the interior. Foreign money must be borrowed to build the lines which will lead to the development of industries, and foreign money cannot be borrowed until the reorganisation loan has been floated or until the Powers interested therein give out the word that they have no further objection to the loan field being open to all comers. It is regrettable that such an impasse has arisen at this juncture. The spirit of the people is enthusiastic for what to them is the new method of transportation, and could occasion be taken by the hand a new era would be certainly and rapidly opened in China. As it is there is jeopardy that a revulsion of feeling may take place owing to a growing belief that there is sinister design in the constant sets back that the loan negotiations have had from varied exterior quarters. To counter this tendency, however, the Railway Association is doing its utmost to foster a widespread recognition of the value of extended communication. The Association has been formed by the men of China actively engaged in railway work. It embraces all connected with railways from the Minister of the Board down to the lowest of the executive officers. One of its most active supporters is the Director-General of Railways, Mr. Yi Kung-cho. Managing Directors, engineers, and traffic men all assemble at given times to hear and discuss papers on various aspects of railway enterprise. They hold regular meetings, and carry on a propaganda work that is not realised by foreigners. A magazine specially devoted to railway subjects is published by them in Chinese; it records all the doings of the Association and publishes any papers read from time to time at the meetings. This Association is likely to have a strong influence as time goes on. At present it is in its infancy, and much like the baby in its cautious efforts to keep itself from falling in its early essays at pedal progression. But it is courageous. At one of its meetings in March it listened and approved a paper on the subject of nationalisation of railways. This is the question which afforded the peg upon which the revolution was hung. It brought the downfall of the Minister of Communications who suggested it, and generally paved the way for the overthrow of the Manchu régime. In this paper a strong appeal was made for centralisation of authority over railways in China, either through the Board of Posts and Communications or some other specially appointed organisation. The paper emphasised the fact that the question had not, in the past, in China, been dealt with upon its merits, and no opportunity had been given the people to grasp thoroughly what benefits may accrue to them by State management of railways. It urged that the time had come for the whole subject to be gone into and for the adoption of a definite policy; and it further called for the Government and the provinces early to come to an agreement upon the points which must be discussed between them and which are vital essentials in securing the future welfare of the nation, to say nothing of that efficiency in railway administration upon which success so much depends. To open up this question at this time shows more than anything else that the Railway Association is not only progressive but also understands the needs of the time, and has the moral courage to talk of them. Such a body of men is likely to be of great service in the country, and given a speedy settlement of China's financial difficulties they may be able to do something to inspire an extended and continuous policy of construction throughout the provinces.

THE PRESIDENT AND THE PHILIPPINES

Naturally, in view of the assumption of office by President Woodrow Wilson, there has been a considerable amount of speculation in regard to the future of the Philippines. Some, with whom the wish was father to the thought, declared that the granting of independence to the Filipinos was within measurable distance. Reports emanating from interested sources declared that President Wilson meant to take drastic and dramatic action in regard to the Philippines. A telegram from Mr. Frank H. McIntyre, Chief of the Bureau of Insular Affairs at Washington, cleared up much of the misunderstanding that these reports had caused. Mr. McIntyre authoritatively stated that there was nothing to suggest that the new President intended radically to change the policy followed in relation to the Philippines.

We do not pretend to know what the Philippines policy of the new Cabinet will be. That the sense of responsibility that they must feel will deter them from any over-hasty action we confidently believe. Whatever abstract ideas and theories members of the Cabinet may hold, what they have to consider are concrete facts. Those who know the Philippines and the Filipinos best are unanimous in stating that to grant them independence in their present stage of development would be utterly disastrous to the Filipinos themselves. The Filipinos are not a nation imbued with a national spirit. They are an agglomeration of different tribes, many hostile to each other, with no common ideals or aspirations. To grant them independence whuld be to throw the whole Archipelago into turmoil and to undo the good work that has been done since the American occupation. There are many other reasons why America should not withdraw her hand from the Philippines plough when her labours are but half complete. One of the most important is her duty to the rest of the world. Wisely or unwisely, it is not material at this moment to enquire, America made herself responsible for the regeneration of the Philippines. Speaking broadly, order has been restored and the Islands given a fair start along the path of prosperity. The other nations are only glad to see America transforming what might have been a centre of intrigue and disorder into a land under conditions equivalent to those occupied by the Federated Malay States under British suzerainty. Were America to withdraw before she has secured the perpetuation of the conditions that now prevail in the Philippines, she would be failing in her duty towards the rest of the world. We trust and believe that that consideration will largely determine the policy of the new Cabinet in regard to the Philippines.

THE YOUNG CHINESE ENGINEER

With the growth of railway enterprise in China the builders of lines are beginning to feel acutely the great need which exists for trained men of Chinese nationality. Until quite recently no sustained effort has been made to equip Chinese students with a practical knowledge of railway working. The result is a deplorable dearth of Chinese capable of filling the conditions called for in the numerous technical branches of railway construction and administration. The Board of Posts and Communications is at last beginning seriously to encourage young men to take an intelligent practical interest in their work, and a College has been carrying on for some time with the object of training students for the new avenue that is rapidly opening to them. What should be done, however, is to see that students get practical training as a course of their studies. In fact it would be preferable that the students who have gone abroad to learn engineering should be compelled to enter upon a period of actual work on railroad or in factory. American engineering firms should turn attention to this matter. The more men they train to know their manufactures, and how to obtain the best results from them, the better it will be for the future of the men so taught, the country they are destined to work in, and the manufacturer. In the past students have been turned out of the Universities and Colleges of America with little else but theory. They have returned to China loaded with degrees and honors, but unacquainted with the business end of a file. Sometimes responsible positions have been given them and unless the native talent in them has been of high enough order to inspire the young "engineer" to turn to and graduate in the school of practical effort, more harm than good has resulted. Certainly progress has been impossible along sensible lines. There is a rich field in this direction lying at hand for American manufacturers to cultivate, and some steps should be taken to offer the students now in the various Universities and Colleges in the States an opportunity to learn what applied science in America means, and a chance to familiarise themselves with American methods of manufacture, industrial development, railroad building, mining, etc.

There are at present a large number of Chinese students in America and each year sees larger numbers travelling thither to learn what can be offered in the various sciences. Those at present engaged in various branches of engineering may or may not be known in America, but for the information of those desirous of getting into touch with these young men we give herewith a list of names, the subjects they propose to graduate in, the year of graduation, and the Universities or Colleges at which they are studying. American manufacturers have a golden opportunity of instilling into the minds of these young men something of the practical side of engineering enterprise. They are as follow:—

CORNELL UNIVERSITY

Chen Cheng-shi,	Railway Engineer. Class 1915.
Yang Shao-shin,	Mechanical Engineer. Class 1915.
Chiu Wei-ying,	Mechanical Engineer. Class 1915.
Cheng Yi-tsao,	Mechanical Engineer. Class 1914.
Yao Pei-shen,	Agricul. Engineer. Class 1914.
Ping Chi,	Agricul. Engineer. Class 1914.
Chon Jen,	Mechanical Engineer. Class 1914.
Chen Fu-shi,	Mechanical Engineer. Class 1914.
S. S. Hu,	Agricul. Engineer. Class 1914.
Chi Ta-hung,	Cornell Univ. Hydraulics. Class 1914.
Ko Shon-shun,	Agricul. Class 1914.
Lu Yuen-chang,	Architecture. Class 1914
Nye Shen,	Mechanical Engineer. Class 1914.
M. K. Chen.	Electrical and Mechanical Engineer. Class 1914.
Y. Wang,	Agricul. Class 1914.

COLORADO SCHOOL OF MINES

Chang Ching-fen,	Mining Engineer and Metallurgist. Class 1915.
Lung Yi,	Mining Engineer. Class 1915.
Tsai Yi,	Mining Engineer. Class 1915.
Cheng Yi-ta,	Mining and Metallurgy.
Cheng Ta-shen,	Mining Engineer. Class 1914.
Fu Shon,	Metallurgy. Class 1914.
Kao Chung-teh,	Mining and Metallurgy. Class 1914.
Li Ping,	Metallurgy. Class 1914.
S. Y. Wang,	Mining Engineer. Class 1913.
W. C. Yang,	Mining Engineer. Class 1914.

UNIVERSITY OF ILLINOIS

Chou Lun-yuen,	Mining Engineer. Class 1915.
Liang Tu-heng,	Agricultural Engineer. Class 1915.
Yen Wei-tsing,	Electrical Engineer. Class 1914.
Ku Chung-hi,	Railway Administration. Class 1915.
Yu Cheng-yung,	Agricultural Engineer. Class 1915.
Pao Kan-loh,	Agricul. Class 1913.
Woo Tsing-tu,	Electrical Engineer. Class 1913.
Y. Y. Yang,	Agricul. Class 1913.
C. S. Chien,	Agricul. Class 1914.
C. C. Chu,	Agricul. Class 1914.
Chuang Chien,	Architecture. Class 1914.
C. K. Wu,	Civil Engineer. Class 1914.
C. S. Chu,	Electrical Engineer. Class 1914.

INSTITUTE OF TECHNOLOGY, BOSTON

Chen Ming-shou,	Mechanical Engineer. Class 1915.
T. Chang,	Mining Engineer. Class 1915.
S. C. Chen,	Civil Engineer. Class 1914.
Y. L. Wu,	Electrical Engineer. Class 1913.
C. K. Yuan,	Electrical and Mechanical Engineer. Class 1916.

H. K. Chou,	Mechanical Engineer. Class 1914.
Techun Hsi,	Mining Engineer. Class 1915.
S. D. Li,	Mechanical Engineer Class 1915.
Y. T. Ying,	Mechanical Engineer. Class 1914.

UNIVERSITY OF MICHIGAN

G. Y. Cheng,	Civil Engineer. Class 1914.
T. K. Chen,	Civil Engineer. Class 1914.
C. C. Fu,	Mechanical Engineer. Class 1914.
C. W. Shen,	Civil Engineer. Class 1914.
S. H. Waung,	Mechanical Engineer. Class 1914.
Cheng Hu-hua,	Mechanical Engineer. Class 1917.
Chen Teh-fen,	Electrical Engineer. Class 1916.
Fei Chung-fan,	Civil Engineer. Class 1915.
Lo Pang-chieh,	Civil Engineer. Class 1917.
Lu Hung-shang,	Architectural Engineer. Class 1915.
Yen Fang,	Civil Engineer. Class 1915.
Weng Keng.	Civil Engineer.

PURDUE UNIVERSITY

Sun Chi-ting,	Mechanical Engineer. Class 1915.
Shin Sun,	Mechanical Engineer. Class 1915.
C. Y. Chiu,	Agriculture. Class 1914.
Hsu Shu	Electrical Engineer. Class 1915.

LEHIGH COLLEGE

Chu Fuh,	Civil Engineer. Class 1913.
H. C. Wang,	Electrical Engineer.
T. S. Yeh,	Electrical Engineer. Class 1914.

NORWICK UNIVERSITY, NORTHFIELD VT.

T. L. Lee,	Civil Engineer. Class 1915.
C. C. Tseng,	Electrical Engineer. Class 1914.

UNIVERSITY OF WISCONSIN

M. S. Chang,	Electrical Engineer. Class 1914.
S. S. Kuo,	Agriculture. Class 1914.
S. Minghai Ma,	Mechanical Engineer. Class 1915.
S. J. Shu,	Mechanical Engineer. 1914.
Kao Ta-kuang,	Mechanical Engineer. Class 1915.

WORCESTER POLYTECHNIC

Y. C. Mai,	Electrical Engineer. Class 1914.
S. J. Yang,	Electrical Engineer. Class 1914.

UNIVERSITY OF OHIO

T. C. Chang,	Electrical Engineer. Class 1913.

COLUMBIA UNIVERSITY

K. C. Chou,	Mining Engineer. Class 1913.
Jone Shi,	Mining Engineer. Class 1914.

THE AMERICAN LEGAL ADVISER

The selection of Dr. Frank Johnson Goodnow as Adviser to China on Constitutional Law should be a matter of interest and satisfaction to all Americans. Mr. Goodnow was chosen for this post by the Carnegie Peace Foundation, who acted in this capacity upon the direct request of the Chinese Government. The heads of the Peace Foundation were communicated with by telegraph early in January last to select a gentleman versed in constitutional law, especially French constitutional law, and mentioning that his first duties would be to assist the Committee to be appointed to draft the Constitution.

In view of the delicacy of the commission it is certain that the Carnegie Peace Foundation investigated every possible candidate thoroughly, and their selection fell upon a gentleman entirely worthy of the post, and carrying with him special ability for the task he would be called upon to perform in this country. That the Peace Foundation chose Dr. Goodnow is sufficient recommendation, for China can be sure that the best available man has been secured. The thought of submitting the matter to the Carnegie Peace Foundation was a distinctly happy one, and whoever suggested it in Peking is worthy of commendation. It is the one method of obtaining what a responsible body of people judge to be the most talented man for the position.

Dr. Goodnow will not come to Peking a stranger, for there are many Chinese students here who have studied under him in America. As a University Professor he is well-known, but he is probably better known for the valuable works he has written on the administrative law of the United States, and political and municipal problems.

Dr. Goodnow was born in Brooklyn on January 18, 1859. He was educated at Amherst and Columbia, gaining his A.B. in 1879, and his A.M. in 1887, at the former Institution, while at the latter University he gained his LL.D in 1882. He took his LL.D. at Amherst in 1897, at Columbia in 1904, and at Harvard in 1909, this being subsequent to study in the Ecole Libre des Sciences Politiques, Paris, and University of Berlin. In his professional capacity Dr. Goodnow was instructor of history, and lecturer on Administrative Law of the United States from 1883 to 1887, and was adjunct professor of the same from 1887 to 1891. He was professor of administrative law from 1891 to 1903, and later became Eaton professor of Administrative Law and municipal science in 1903.

Among the works of Dr. Goodnow are the following:

Comparative Administrative Law, published in 1893; Municipal Home Rule, 1895; Municipal Problems, 1897; Politics and Administration, 1900; City Government in the United States, 1904; Principles on the Administrative Law of the United States, 1905. He was also Editor of Selected Cases on the Law of Taxation, 1905; Selected Cases on Government and Administration, 1906; Selected Cases on the Law of Officers, 1906; Social Reform and the Constitution, 1911.

Dr. Goodnow was married in 1886 to Miss Elizabeth Lyall, of Brooklyn.

DR. CHEN CHIN-TAO

China's Delegate to the International Congress of Chambers of Commerce

Dr. Chen Chin-tao, Ph.D., Yale, has the reputation of being a mathematician of high degree. He is without doubt the foremost in the Far East, and his training specially fitted him for the post he held as Minister of Finance for the provisional Republican Government. Some years ago Dr. Chen had the distinction of winning the first three prizes in a mathematical competition arranged by a piano company in America. The advertisers gave a problem to work out, and offered pianos as prizes for the best solutions. Dr. Chen found three solutions of the problem. He selected the best one for himself, gave the second best to a friend, sent in the third in the name of the household cat, and to his amusement found that his solutions won the first three prizes. Dr. Chen commenced his education at Queen's College, Hongkong, and early showed a disposition to specialise in mathematics. The principal of the school, Dr. Geo. Henry Bateson-Wright, encouraged his pupil by giving him special lessons out of school hours, and Dr. Chen quickly developed a faculty for mastering intricate problems. From Hongkong he went to Tientsin, where he became teacher of mathematics in the Collegiate Department, and was following that profession when the Boxers descended upon the Capital. Leaving the north when escape was possible he went to Shanghai and taught mathematics in the Nanyang College, and later went to America to pursue his studies, graduating from the California University in 1902. From there he went to Yale and graduated in 1906, taking his Ph.D. and the Publication Prize for his essay on Societary Circulation, dealing with the circulation of money in its relation with prices. Dr. Chen invented a hydraulic machine to illustrate the principles of this subject, and another machine to solve numerically high degree and transcendental equations. Returning to Peking he sat at the examination of returned students in 1906, and had the honour of coming out top of the list. He then entered the Board of Finance as a secretary, later was appointed an inspector in the Taching Government Bank, and was eventually sent to different countries to study the manufacture of bank notes. Under his supervision the Bureau of Engraving and Printing was organised and established by him at Peking and has been adjudged to be one of the best equipped bank-note printing establishments in the world, being modelled after the Washington bureau. A few months after his return from abroad Dr. Chen was appointed Vice-President of the Taching Bank, and later Chairman of the Committee to devise a scheme to reform

the currency. With that scheme he was sent abroad to confer with the financial experts of the Powers participating the proposed loan and at the conferences held at London, Paris and Berlin it was quickly acknowledged that he was a man of high attributes and Sir David Barber, Prof. Jenks and others acknowledged that he should rank with the foremost experts on currency matter in the world. When Yuan Shih-kai was made premier just prior to the fall of the Manchu Dynasty Dr. Chen was given the post of Vice-Minister of Finance, but he ultimately joined the Republicans and became their first Minister of Finance, a desperate task in the latter days of the Revolution. Dr. Chen devised the patriotic loan, and arranged a scheme of finance which would have enabled the Republicans to carry on the war for a considerable time without foreign assistance.

Dr. Chen went to America to attend the International Congress of Chambers of Commerce, at which he represented China. He also proceeded to San Francisco to select a site for the Chinese Government building at the Panama Exposition in 1915. On that occasion, the Exposition Authorities and the people of California extended to Dr. Chen a great welcome. Both the Exposition Authorities and the Civic Authorities of San Francisco gave official luncheons, and a military escort was provided to accompany Dr. Chen from the San Francisco Hotel to the Exposition grounds, where the ceremony of selecting a site for the Chinese Government building took place. A military review was held in honour of the occasion, and when the flag of the Republic was hoisted upon the site, a salute of 21 guns was fired from the fort close by. This, perhaps, was the first salute given by a foreign Power to the new Chinese flag. Huge crowds attended the ceremony, and the utmost enthusiasm and good-will prevailed.

From San Francisco, Dr. Chen proceeded to Washington to study the Auditing Department and also the President's Commission for Efficiency and Economy. Thence he proceeded to England, France and Germany, and spent about one week in each country, investigating the working of the Auditing Department. In England, Dr. Chen was greatly impressed by the efficient, practical and business-like methods adopted in the Auditing Department, while the French and German systems impressed him by their scrupulous formality and methodical routine. He believes that the American method resulting from the investigations of the President's Commission of Efficiency and Economy, under such an able man as Dr. Cleveland, will give to the world the most perfect of Auditing Departments.

DR. CHEN CHIN-TAO

While Dr. Chen was in America, he was offered by cable the position of Auditor General for China, and it was because of this that he prosecuted the investigations referred to. On his return to China, he was rather disappointed that circumstances did not afford him an opportunity to carry out the ideas which he developed as a result of his studies abroad. In consequence, Dr. Chen desired to resign his position and to turn his attention to private business activities, but it will be generally hoped that the reorganization of the highly important Auditing Department will be undertaken by the one Chinese publicist who is beyond all doubt eminently qualified to carry out the work efficiently and successfully.

THE LOCOMOTIVE WORKS OF HENSCHEL & SOHN AT CASSEL.

In the July issue of the FAR EASTERN REVIEW appeared an article descriptive of the Locomotive and Machinery Works of Henschel and Sohn at Cassel (Germany). We are now enabled to supplement the information then given and to give illustrations of several types of engines recently furnished by the Henschel Works. Of special interest, in view of the fact that the Tientsin-Pukow Railway is now in active operation and has cut down the period of time necessary to make the journey from Shanghai to Peking by about one half, is the illustration of the 4:6:0 passenger locomotive supplied for this line.

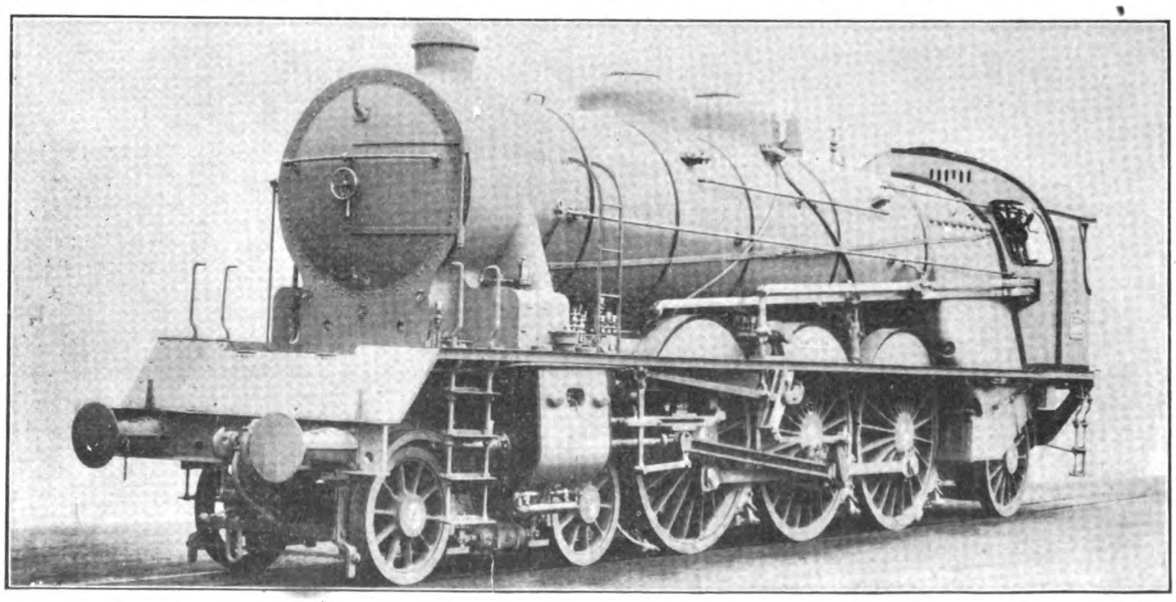
It is of interest to note that the output of the Henschel Works has reached 12,000 and that the annual capacity amounts to over 800 locomotives. The Works are kept operating at high pressure notwithstanding the increases made in the capacity.

In the July article it was mentioned that Henschel and Sohn supplied most of the locomotives to the Prussian State Railways and exported considerable numbers of engines to Russia, Italy, France, Roumania, Servia, Denmark, Turkey. Egypt, the Argentine Republic, Brazil, Chili, Mexico, Japan and China. To this list should be added Siam, Java, Cuba, Spain, Portugal and Holland and there is a constant extension of the field of the activities of the Works.

Regarding the installation of the Works the shops are now supplied with power and light by two electric power stations with an aggregate of 8,700 H.P., 510 electromotors drive the machine tools, and there are 46 travelling cranes, 65 turning cranes, 20 elevators, 45 traverses and 20 turntables. The boiler shop is equipped with 3 hydraulic flanging presses and 8 hydraulic and 2 electric rivetting machines.

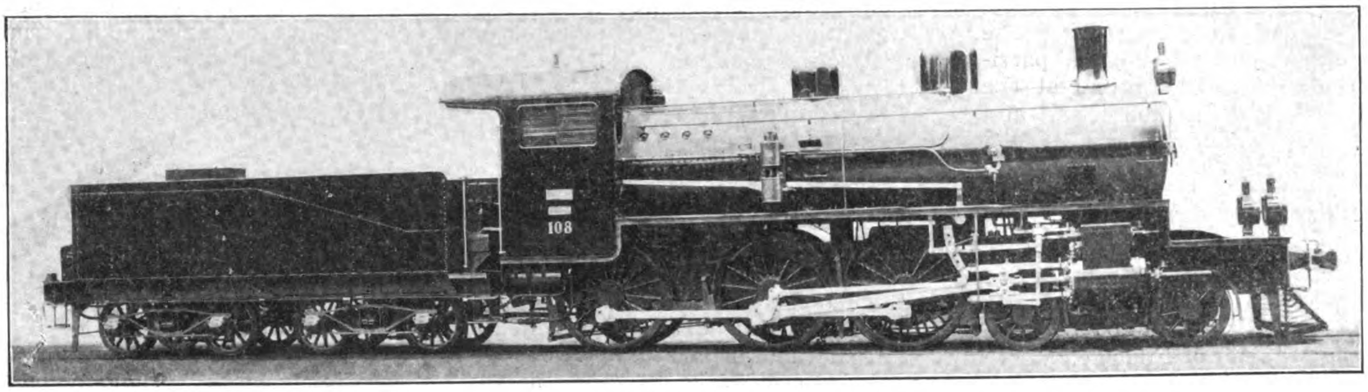
The work shops also contain 46 annealing, welding and hardening furnaces and 350 forges. The smithies are fitted with 40 steam hammers.

The accompanying are illustrations of notable engines with drop weights up to 4½ tons recently turned out by the Henschel Works:—

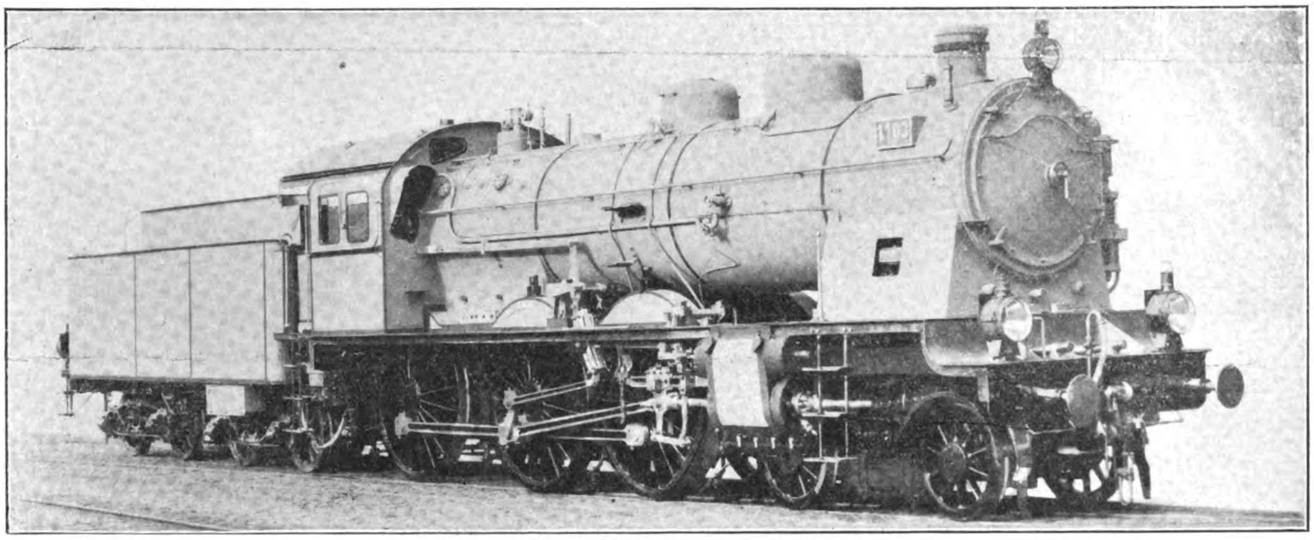


4:6:2 Four-cylinder Superheated Steam Express Locomotive "Pacific," delivered to the Paris-Lyon-Mediterranean Railway

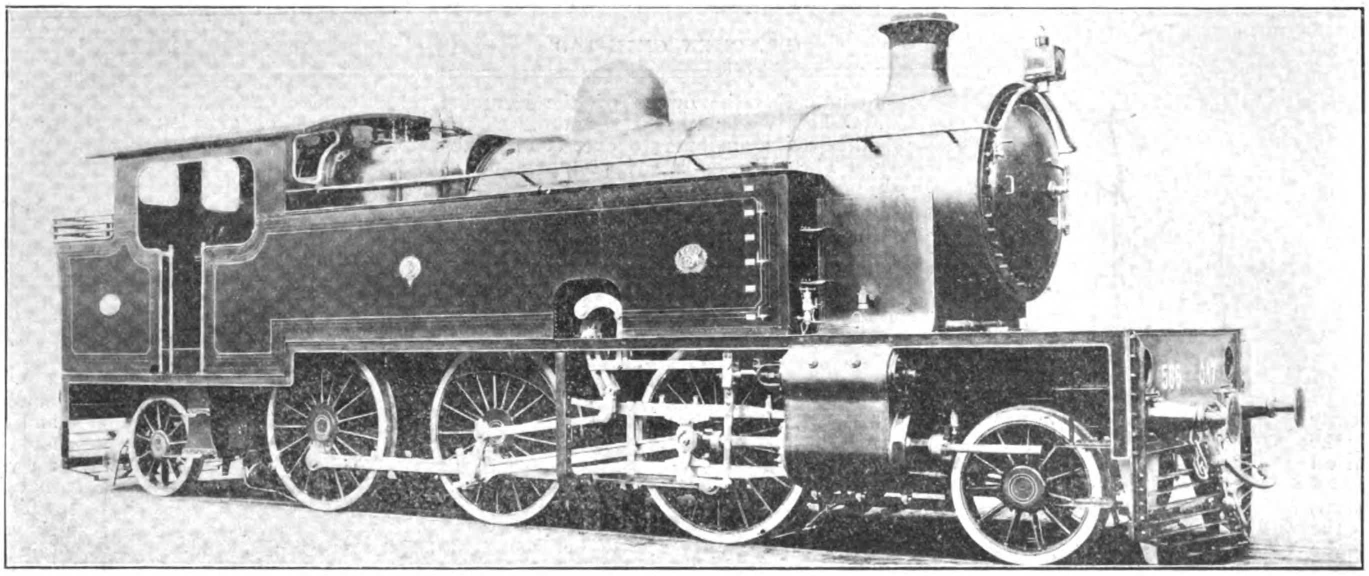
The Locomotive Works of Henschel & Sohn at Cassel



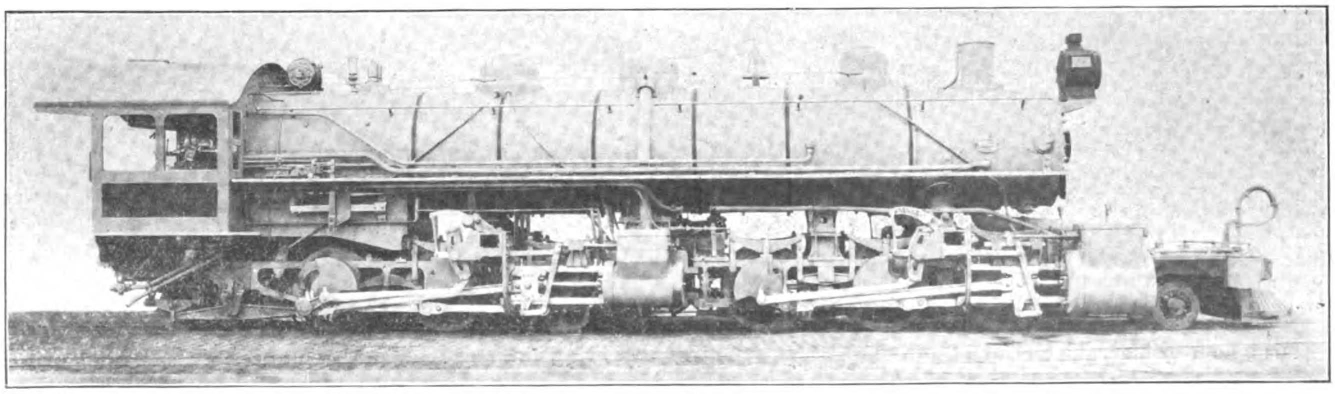
4 : 6 : 0 Passenger Locomotive with 8-wheeled tender, delivered to the Tientsin-Pukow-Railway



4 : 6 : 0 Four-cylinder Superheated Steam Compound Locomotive, delivered to the Prussian State Railway



4 : 6 : 0 Tank Locomotive, delivered to the Egyptian State Railways



2 : 6 : 6 : 2 Mallet Goods Locomotive, delivered to the Brazil Railway Co.

CHINA'S NATIONAL ANTI-OPIUM CRUSADE

ITS BEGINNING AND RESULTS

Sections of Chinese have been fighting opium for over a century. An Imperial Edict was issued against the drug in 1796, but the most important work has been done in recent years.

In 1908, the famous Imperial Edict was issued ordering the prohibition of opium. The national movement however, began in 1910, with the formation of the National Anti-Opium Society.

It was in October 1910 that the Chinese, hearing that the British people had set apart October 23 (which was the 50th anniversary of the ratification of the Treaty of Tientsin), as a day for commemoration and prayer for the ending of the Opium Trade, felt that they must do more themselves to stamp out this great evil.

Under the leadership of Mr. Lin Ping-chang, the grandson of the famous Commissioner Lin, who burned the opium in Canton in 1840, the National-Anti-Opium Society was organised in Peking. In co-operation with the International Reform Bureau, the endeavor was made to crystallize the spirit of the Chinese people into a national movement against opium. The first work done was to secure action by the Tsu-Cheng Yuan, urging that the Treaty about to be signed for a continuation of the Opium Treaty for seven years be not signed. The members of the National Assembly stated that they did not wish to continue the Treaty for seven years longer and they asked the Wai-Wu-pu not to sign any Treaty.

The Chinese Board of Finance stated at that time in the National Assembly that the Government was ready to give up all opium revenue.

The Anti-Opium Society urged that the Treaty of Tientsin be at once denounced, and appealed to the Chinese Government to take that action. In fact the document was prepared by the Chinese Foreign Office, denouncing the Treaty of Tientsin, which would at once have put an end to the trade in foreign opium. However, strong pressure was brought to bear upon the Chinese Government to prevent it taking such a drastic step, and the Opium Agreement of 1911 was signed. This Agreement gave China the right to suppress opium, its cultivation, retail sale and smoking, while still permitting the importation of foreign opium under certain conditions, which importation was to stop, however, when China reached success in the prohibition of cultivation.

The Revolution gave an opportunity to the farmers to renew planting of poppy in some sections, but one of the first acts of the Republican Government in Nanking was to issue mandates against opium.

LIEUT.-GENERAL L. CHANG

Chairman, National Opium Conference, Peking—Military Adviser to President Yuan Shih-kai

President Yuan Shih-kai soon after taking office in Peking, also issued strong Proclamations calling for strict opium prohibition.

In June 1912, the National Laws against the cultivation, sale and smoking of opium were promulgated. The Anti-Opium Society in various provinces became very active, many burnings of opium taking place; and almost every newspaper in the land took a stand against opium.

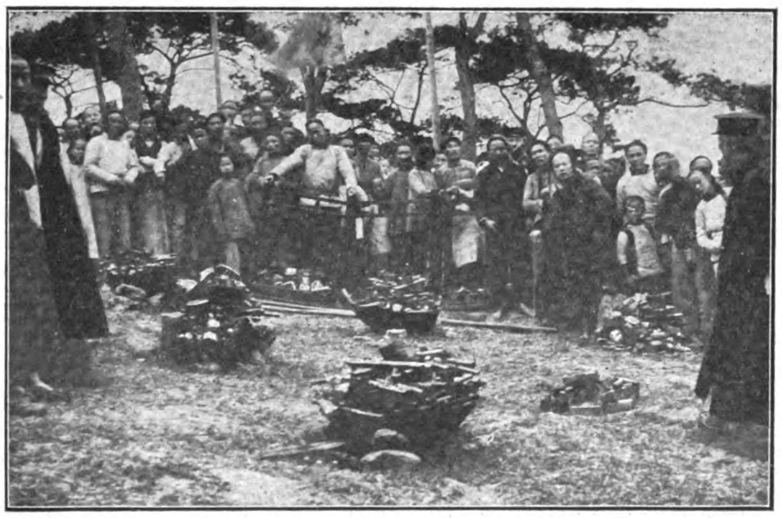
The result of this national movement was the forming of the International Opium Conference in Peking in 1913.

This Conference was composed of delegates from various provinces and different departments of the Central Government, and concluded its sittings on March 8. It decided that the time had now come for the definite prohibition of the cultivation, smoking and sale of opium in China. The discussions by the delegates awakened echoes in many quarters, and appreciation of the work done by the Conference has already been received by telegram from many of the governors of the provinces who sent delegates. On March 13 General Li Yuan-hung, Vice-President of the Republic, telegraphed saying that he appreciated the work of the Conference, and, noting that the Conference had decided that steps should now be taken to do away with opium altogether, he had accordingly issued directions to the Commissioner of Home Affairs in his province to carry out the laws against opium on that basis.

The movement against the drug has now obtained such impetus that it is generally believed that the trade will never again be resumed. The stopping of the import of Indian opium into China as a temporary measure will prevent an influx of this product in the future, and, commensurate with the reduction of the imported stocks, it is felt that the native opium can be reduced.

If China continues to do her part in the manner in which she is now doing it the death knell of the trade will soon be sounded.

The great question that confronts the people of China is how to rid themselves of the stocks of Indian opium in warehouses in Shanghai, to say nothing of the native opium that is stored waiting sale in other parts of the Republic. It is claimed that Indian opium to the value of Mexican $120,000,000 is stored in the various treaty ports awaiting buyers, with



Opium Burning at Foochow by the "Put Away Poison Society," which has been working so hard to have the opium cultivation destroyed at Hsing Hua, Fukien

Opium Burning at Tientsin, December 22, 1912. Saturating the opium with coal oil at the heaps prepared for burning

very little market for its sale. The actual cost price of this opium will not perhaps, exceed $70,500,000. Acuteness has been lent to the question by the financial involvement of Foreign Banks. They have, in the course of business, advanced large sums to the opium dealers against the stocks, and it is the embarrassment in which the dealers find themselves through the stoppage of sales that compels the banks to press for what is described as compliance with the Agreement of 1911, which provides for the gradual and not the sudden suppression of the trade.

At the instance of the banks so involved the Shanghai Consular representatives of several countries approached the Ministers in Peking for protection against loss by the closing of the market against Indian opium, but the Chinese Government found itself unable to do more than issue proclamations urging the people to comply with the 1911 Agreement. That may mean anything since the Agreement specifically lays it down that smoking may be stopped, and if smoking is rigorously prohibited it must follow that sales will decrease and demand in time entirely disappear.

The Chinese Government feels that it cannot be expected to bear responsibility for the disposal of stocks of a drug which is not wanted in the country.

It, however, feels the pressure being brought upon it, and as a way out of the difficulty, recently sounded the British to see if they would agree to China making an opium monopoly something after the manner in which the Japanese Government controls opium in Formosa. The merchants engaged in the opium traffic have made allegations that China was desirous of surpressing the Indian trade in order herself to monopolise opium for revenue purposes. Therefore the Government felt it necessary to see what the British Government might think of such a proposal before taking any step to formulate a scheme. Realising the difficulty which confronts China in regard to the disposal of the tremendous stocks in Shanghai, the British indicated that they would only approve of a monopoly if its sole design was to bring the trade to a speedy extinction. Since that indication, nothing official has been given out, although news of the proposed monopoly was published in the papers and brought forth many protests from the provinces. Whether, in face of these protests, a monopoly designed to suppress the trade, and designed as a means to assist in the solution of the financial problems involved, can now be introduced remains to be seen.

A public meeting was held on March 20, at Peking at the call of the Peking Missionary Association to consider the opium question and China's appeal for help. The meeting was composed of British and American missionaries and also the President of the National Opium Conference with some other members. The meeting was strongly in favor of China's efforts to stamp out opium from the natiou and supported the right of the Chinese Government absolutely to prohibit the use of and retail sale of the drug. They urged that the Republic of China take a firm stand against any attempt to force the opium stocks upon the people of this nation and declared that China will have full support of public opinion for her. It was moved by the meeting that a Committee of five be appointed to draw up a memorial to the British Parliament asking that China be released at once from treaty obligations to receive opium. It was also moved that the meeting express sympathy with China's efforts and urge the Government to take a strong and public stand to prevent her people from using or purchasing any of the opium stocks in Shanghai or other places. For the continuation of this advice, it was stated in the meeting that China has perfect right to do this morally and under the treaty, and that she will have the support of the whole world in her efforts.

The opponents of the drastic steps that are being taken to abolish the use of opium claim that China is deliberately breaking the Agreement by stopping the retail sale, but the feeling of China is that she has a perfect right under the treaty to suppress opium. This suppression would, naturally seriously affect the wholesale trade, and thus tend to bring loss upon those who laid in stocks in the hope of getting rid of them before the traffic ultimately ceased.

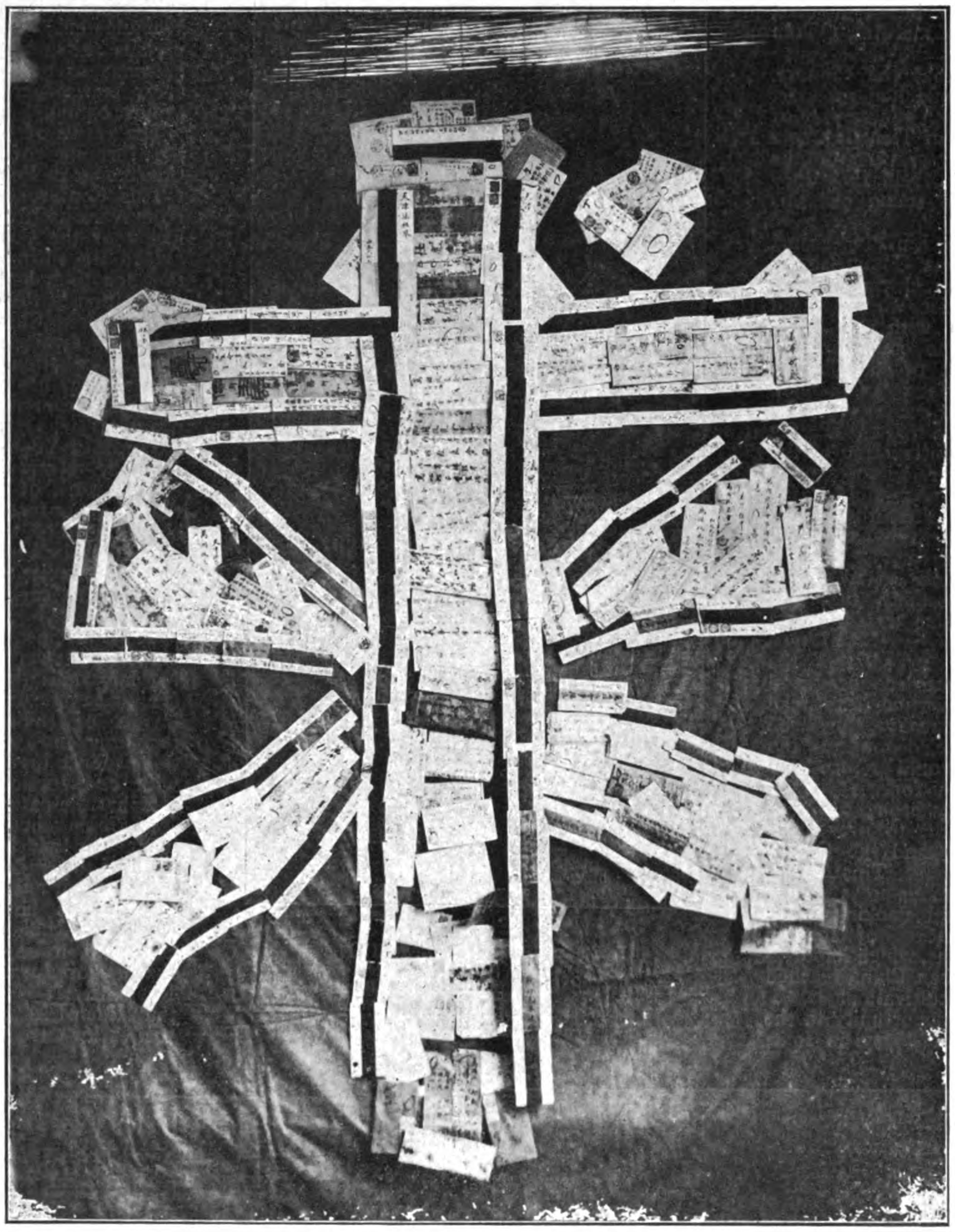
The activity of the banks and the subsequent enlistment of the support of the Ministers in Peking gave what is claimed to be an international aspect to the question, but it is interesting to note in this regard that on March 13 a telegram was received from Washington stating that the former Secretary of State, Mr. Knox, had instructed the American Consul in Shanghai not to participate in any support of the demand of the American banks or other interests in the opium trade. This definitely sets down America's view of the matter. The other countries involved are, perhaps, not to be blamed for striving to save their nationals from loss, but it is a debatable question how far China can be held responsible for what is described in many quarters as the speculation of the opium dealers.

The National Opium Conference, besides passing some twenty resolutions which referred largely to the internal suppression of opium, made, as a final action, an appeal to the whole civilised world for co-operation in the effort to buy up as much of the opium as possible and to burn it. This appeal will be sent broadcast about the world, and a Continuation Committee was appointed by the Conference to sustain efforts to make the appeal known. The delegates to the Conference feel that while the stocks of opium are in China they are a positive injury to the anti-opium campaign, the effect being that while the Chinese Government is using drastic measures to stop cultivation and retail sale as well as smoking, the stories of large amounts of money being made by the opium dealers in Shanghai, and the continued sale of foreign opium in China, can only discourage and make ineffective many of China's efforts.

The prime movers in the campaign state it as their conviction that if this opium can be destroyed much injury can be avoided and many lives saved, and if foreign interest in the movement can be exhibited in the manner suggested by the Opium Conference it is felt that a ready response will also come from these Chinese who now are partial to the continuation of the trade. It is claimed that the Chinese are now so desirous of being like other people that destruction of opium would have a tremendous effect upon the minds of the people. Not only would there be a bonfire of native opium for every bonfire of foreign opium, but a strong pro-foreign feeling would be generated.

Only a short while ago nearly $15,000 (Mexican) worth of native opium was collected at Hankow and was burned in public with much enthusiasm. A similar thing took place recently at Tientsin.

Right through the country the feeling against opium is growing, and the Government is ex-



Chinese character "Appeal" made from some of the hundreds of letters sent in from all over China asking that the opium trade come to a speedy end. 150,000 Chinese signed their names to the petition sent in 1910 to Great Britain asking that the opium trade be ended

hibiting a very strong hand in the matter. In many districts government troops are out in the country locating poppy fields and rooting up the plants. In the province of Fukien a veritable campaign was conducted against the villagers owning poppy fields and the brigands and others who joined with them to resist Government interference. The opposition was so strong that the authorities were compelled to have gunboats patrolling the coast in the vicinity of Hsing-hwa, whilst a large force of troops was sent out. Several pitched battles were fought, and the latest reports indicate that 600 poppy planters and others who joined with them have been killed in engagements with the troops. Much of the poppy has been rooted up, and the embryonic rebellion which was generated has been crushed.

This little affair at Hsing-hwa, is an answer to the charges brought that the Central Government had not sufficient authority over the provinces to assert itself. The whole campaign in this province was carried out upon telegraphic instructions from President Yuan Shih-kai, who acted upon information supplied him by the Anti-Opium Society.

In other districts drastic suppressive measures have been inaugurated. Orders have been issued for punishments of all kinds to be inflicted, from confiscation of property and imprisonment to death by shooting. In this connection it is interesting to note that an independent authority who has investigated the opium situation reports that the work so far done by the Government has "routed the scoffing and put to shame all scepticism" raised in 1906 when the Edict ordering the suppression of all poppy culture and opium smoking in China was issued by the old Empress Dowager Tzu-hsi.

This authority commenting on the attitude of the Government, says "the Chinese local and provincial authorities have been and are still most earnest in their efforts to reduce the area of poppy cultivation and to suppress opium smoking. If this be the aim of the agreement of May 8, 1911, then the provisional government has not lacked support in its efforts to effectuate that agreement. But if we consider the purpose of the British Government as one to protect the opium revenue of India from too sudden a decline and save the opium merchants from financial disaster by securing a gradual extinction of their trade, then it cannot be said that the local and provincial authorities have been supporting such a program. The order of the President, of Dec. 25, 1912, issued in response to the remonstrances of the British Minister, shows that it was necessary to make an attempt to restrain the anti-opium zeal of the provinces. As a matter of fact, however, the provincial authorities in southern and central China have not been influenced to any great degree by the desires of the Peking Government. The campaign against poppy growing and opium smoking had already aroused the greatest enthusiasm and attained wonderful success before the agreement of May 8, 1911, was made. In fact, poppy growing had almost disappeared. The total output of native opium for 1911 was probably not more than 20,000 piculs. Since the Republican officials came into power, they have, with a few exceptions, been more earnest in their efforts to eradicate the evil than their predecessors of the Imperial Government. Many of them are young men full of enthusiasm. Some of them, men of foreign education, ashamed of the reputation of their country among other nations and heedless of the suffering of the victims deprived of the drug, as well as of the financial ruin of merchants engaged in the trade, have bent their energies to one end only,—the immediate removal of the stigma of opium-smoking from their people. To accomplish this end any measures, in their eyes, are justifiable, and the methods employed are as drastic as can well be imagined.

"In Kuangtung, Hupeh, Hunan, and Szechuan, lands devoted to poppy culture have been confiscated, the poppy plants have been uprooted, the opium produced has been seized and destroyed, resistance has been put down by force, and violation of the law in at least three provinces has been punished with death.

"In Kuangtung, Chekiang, some parts of Kiangsu, in Fukien, Hupeh and Hunan, the retail shops have been closed, and the import of foreign opium thus made unprofitable.

"In several places for a second offence, smoking is punished with death. Earnest efforts were made to stamp out the curse by the end of 1912. A system of espionage was established in several of the provinces and informers were rewarded with a portion of the fines levied. In a number of cities, the

Leaders in the National Anti-Opium Society at Peking which started the national movement in 1910. One of these leaders was General L. Chang, Chairman of the recent National Opium Conference at Peking. The President of the organization is Lin Bing-chang, a grandson of the famous Commissioner Lin, who destroyed the opium at Canton in 1840, which led to the first so-called "Opium War."

Sample of the Cartoons issued in connection with the campaign.—The two smokers bemoaning the fact that smoking has lost them house, money, wife and child

Sample of the Cartoons issued in connection with the campaign.—The tiger will not even eat smokers of opium

opium seized and great quantities of opium smoking apparatus were publicly burned in the presence of the officials and representative citizens, as well as invited foreign guests, and speeches were made which were received with great applause, so that the event was marked as one of great social importance.

"But there are a few places in which the officials have not been earnest in the prosecution of the anti-opium campaign.

"In the province of Kueichow, the planting of the poppy has been very extensive. By some, the acreage is reported as being equal to that of any year in the past; by others, as about sixty per cent. of the maximum. The attention of the Central Government has recently been called to this relapse, and orders have been given to the province to proceed systematically to uproot the plants. It is too early as yet to report the result.

"In southern Szechuan, in Ning-yuan Prefecture, planting has been very general since the outbreak of the Revolution. The district is one difficult to control because inhabited, to a considerable extent, by the half-civilized non-Chinese tribes that pay slight regard to the orders of the authorities unless backed up by a show of force. This unfortunately has been lacking, since the Revolution broke out. Western Szechuan has also shown a recrudescence of poppy planting, but the region in question has been greatly disturbed by the war with Tibet.

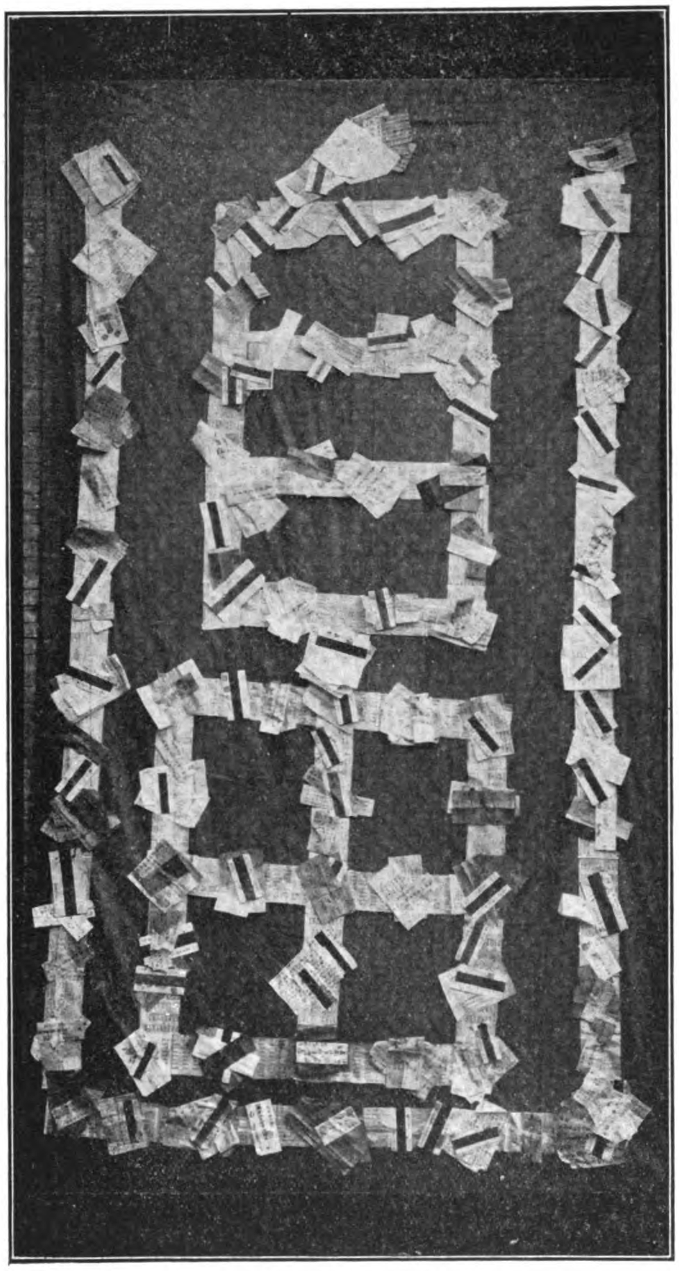
"In southwestern Shensi, and in Kansu, too, there have been relapses. In the former province, a large crop was harvested in 1912. That sown last autumn was in some places uprooted by the officials and some peasants, who opposed this action, were put to death. In Kansu, the crop harvested in 1912 was as large as any that preceded it before the Revolution, and the Tutuh is now taking active measures to recover the lost ground. Both these provinces were greatly disturbed during the Revolution and are not yet entirely pacified. The officials have had to give most of their attention to military operations, and the result has been that the anti-opium program was largely neglected until quite recently.

"One of the most serious cases of disregard of official orders has occurred in southern Fukien, particularly in Hinghua Prefecture. A former brigand, who escaped from imprisonment during the Revolutionary troubles, raised the standard of revolution and proclaimed himself Emperor, claiming to be a lineal descendant of the Ming Emperors. He guaranteed protection to the opium planters who were taxed one dollar (Chinese) a *mou* (one-sixth of an acre). Some two hundred thousand *mou* were reported to have been planted in that prefecture, and equally large amounts in two others, and although the troops were ordered to uproot the crop, nothing was done until about three weeks ago, when the President sent some two or three hundred thousand taels to Foochow, with which to settle the arrears of pay due the troops. Since that time, there are reports of military activity, and it is believed that the rebels will be defeated. Unless the poppy be destroyed very promptly, it will be too late to prevent its being harvested.

"It must be admitted that there are in a few districts officials who are profiting financially by their neglect of duty.

"Generally speaking, however, the provincial and local authorities, as said above, are most zealous in the work of suppressing cultivation of the poppy, in checking the traffic in opium and in reducing consumption.

"The Revolution had no effect, so far as the production and consumption of opium is concerned, in the three Manchurian provinces or in Chihli. In Shansi and Honan, there was some tendency to relapse, but slight, and easily overcome. In Kuangtung, the effect of the Revolution was a tendency rather to increase the severity of laws and the strictness of their inforcement; in Hunan and Hupeh, and Anhui, certain districts remote from the official centres showed at first a tendency towards the relaxation of the anti-opium laws, but later, the Republican authorities showed themselves more active than the Imperial authorities that preceded them. In the province of Kueichow, in parts of Kiangsi, in Northern Kiangsu, in Shantung, and in certain lawless districts of Chekiang, in southern Fukien, and south-western Szechuan, there has been a recrudescence of planting and smoking. In Shensi and Kansu, a similar state of affairs has existed, and in all these districts, the evil



Chinese character "Freedom," made up from some of the many letters received from all the provinces in the National Anti-Opium Crusade, asking for freedom from the curse of opium

is being checked, but the lost ground has not been entirely recovered.

"On the whole, it may be said that the overthrow of established order at first led to a disregard of the anti-opium regulations, but that this was soon checked and was followed by a resort to more drastic measures than had been adopted before to suppress the cultivation and consumption of opium.

"The total net imports and value of the foreign opium for the years following the issue of the suppression Edict were as follow:—

	Import	Value
1907..	54,475 piculs	Hk. Tls. 28,653,653
1908..	48,347 „	34,226,337
1909..	48,917 „	35,744,979
1910..	35,358 „	55,410,850
1911..	27,807 piculs	48,256,745
1912*	9,183 „	34,124,028*

*Nine months of 1912 *at the average price at the end of 1909.

"Up to the present, there has been no great loss of revenue occasioned by the suppression of the opium traffic. The attempt to introduce the consolidated opium tax of Tls. 115 per picul as reported in 1906, was not entirely successful. It was never extended to Manchuria, where a tax of Tls. 80 a picul was levied for export, nor in Turkestan. The attempt to impose the tax in Szechuan was resisted by the people and led to riots. Szechuan and Yunnan were in June, 1907, withdrawn from the operation of the tax with the result that Yunnan opium exported through Mengtze paid but Tls. 50 a picul, while Szechuan opium paid a provincial likin of Tls. 7.2 and an export duty of Tls. 20 on every picul shipped, and this opium on passing Ichang, was required, in addition, to pay the consolidated tax of Tls. 115 a picul, or a total of Tls. 142.28 per picul. So far as shown in the customs reports, the total revenue, import, export, and coast trade duties, and the likin so far as coming under the cognizance of the Maritime Customs, were year by year as follow:—

			Hk. T.	
1907..	Total revenue		33,677,702	T. = G.$.79
	Opium	„	6,160,145	
1908..	Total	„	32,753,226	„ „ .65
	Opium	„	5,693,638	
1909..	Total	„	35,444,403	„ „ .63
	Opium	„	7,106,578	
1910..	Total	„	35,399,816	„ „ .66
	Opium	„	4,937,533	
1911..	Total	„	36,013,744	„ „ .65
	Opium	„	5,072,630	
*1912	Total	„	26,086,326	„ „ .753
	Opium	„	3,556,235	(Tr. Cir. Oct. 1912).

*To September

"These figures include the consolidated tax so far as reported. But the amount of the local provincial charges levied in various places, where the consolidated tax was not recognized, is unknown. The doubling of the import duty in 1908 accounts for the large receipts of 1908, 1909, and 1910. The increase noted in 1911 is to be accounted for by the further increase in the duty agreed upon in May of that year between China and Great Britain, the tax having been raised to Tls. 350 per chest for foreign opium and Tls. 230 for the native drug.

"The vigorous measures being taken at present to uproot the growing poppy and in many provinces to suppress entirely the retail trade and the smoking of opium will doubtless have the effect of greatly reducing the revenue during the current year.

"In 1906, I estimated the total production of native opium at 175,000 piculs. In reviewing recently the estimates made at that time, I find that those for the provinces of Shensi and Kansu were too small: these should be about 5,000 piculs each instead of 2,000. On the other hand, the estimates for Kiangsu was undoubtedly too large. It should not be more than 25,000 piculs. This leaves the total about as it is. I can find no foundation for the extravagant estimates published in some quarters, such as 500,000 piculs, or even so much as 300,000 piculs. There are no statistics of production available, but a study of the Customs reports as to the movements of the native opium has led me to the following estimate of the production, year by year, since 1906:—

NATIVE PRODUCTION.

Estimated	piculs	
1906 „	175,000 „	
1907 „	163,000 „	-reduction 7 %.
1908 „	163,000 „	-stationary.
1909 „	155,000 „	-reduction 5% or 11% on 1906.
1910 „	70,000 „	-reduction 54% or 60% on 1906.
1911 „	20,000 „	-reduction 71% or 88% on 1906.
1912 „	40,000 „	-increase 100% or decrease of 77% on 1906."

FAR EASTERN RAILWAYS

THE TIENTSIN-PUKOW RAILWAY

Official Explanation by the German Authorities Connected with the Northern Section

A statement with regard to the Tientsin-Pukow Railway has been forwarded to us by the German authorities interested in the Northern Section for publication, and in view of the importance of this line, combined with the varied character of the statements that have from time to time appeared in connection with the work on both sections, to say nothing of the element of competition that has been injected into the matter, we are glad to give it space. It is only fair to state that when the Engineer-in-chief of the Northern Section was written to by this journal on Dec. 29th, 1912, requesting the usual engineering information, the following paragraph appeared in the reply received under date of Jan. 14, 1913:—

"In reply I regret to say that it is quite impossible for me to furnish you with such a description now. Quite apart from the fact that I am far too busy at the present moment, such a description coming from me would necessarily be a very one-sided one and not in justice to your readers."

The statement and figures are as follow:

"Since the opening of through-traffic on the Tientsin-Pukow Railway, a number of articles have appeared in the press comparing the method of construction adopted by the German and by the British line.

"As is usually the case with non-experts, the comparison is directed chiefly to those parts of the construction which impress one easily, namely to the buildings.

"The Northern Section has been praised on account of the appearance of the station buildings, and fault has been found with the modest exterior of the stations of the Southern Section. Others again have words of praise for the Southern Section pointing out that ornamental designs have been placed aside in the interest of economy, whereas the Northern Section has been blamed for lavish use of money.

"To explain the difference in question, it is necessary to go into detail.

"For a distance of 350 km., no stone was available for construction purposes on the Northern Section. The enormous quantities of stone ballast necessary for so long a distance would have to be brought down from the Tongshan or Peking hills with large expense and equal loss of time.

"For this reason, the Northern Section decided to make their own ballast and erected for this purpose 21 rotary brick kilns along the projected track. In these kilns the raw material was burnt to clinker. This was then broken to the required size and used as ballast. The success of this measure was complete, and the quality of this ballast beyond all expectation. This artificial ballast is, indeed, harder than the natural lime stone ordinarily used as ballast in North China. Although it has now been on the line for a period of three years, submitted to a heavy traffic of construction-, goods- and passenger-trains, it does not show the slightest sign of tear and wear.

"But what had that to do with the buildings? It had indeed a very considerable influence on the ornamental exterior of these buildings. These very same kilns, erected primarily for the manufacture of ballast, simultaneously turned out the whole of the bricks and tiles employed for the walling and roofing of the houses.

"The up-to-date brick kilns that were adopted and the enormous quantities of stones burnt for packing as well as for construction purposes enabled a handsome red brick to be manufactured at one-third of the customary price paid for the common Chinese blue brick.

"The following figures will best show the saving that was effected by the Northern Section using for all roofing their self-made roofing tiles in preference to corrugated iron; a square meter of roofing of corrugated iron would have come to M 2.25, whereas a square meter of their tiled roofing cost them as follows:—

1—made of interlocking tiles	M 0.60
2—made of ordinary pan tiles	M 0.96
3—made of half round tiles	M 1.08

"Under these circumstances it would have been an unanswerable squandering of money on the part of the Northern Section, had Chinese blue bricks or corrugated iron been employed.

"Even the small platelayer's houses were built more cheaply by using the self-made attractive looking red tiles instead of corrugated iron.

"After all, it must be borne in mind that there are also other advantages speaking for the use of high tiled roofs. Iron roofing means cold rooms in winter and warm rooms in summer, whereas tiled roofs have the opposite effect; besides, the flat iron roof makes it impossible to utilise the space below the roof. On the other hand, the tiled roof, although its construction does require more timber, permits of using that space for quarters for Chinese employes.

"In the case of the Southern Section, the circumstances were entirely different, because they possessed quarries from which a sufficient supply of suitable ballast could be obtained. With them, it would therefore have been deliberate waste to erect brick kilns solely and exclusively for the purpose of manufacturing their own red bricks and tiles for their buildings, not to mention the expensive procuring of tiles from Shanghai.

"That is one of the reasons why the Southern Section had to erect buildings of a plainer character.

"Another cause why the edifices of the Northern Section are more pleasing to the eye, is the fact that some of them have two and even more stories. And also here, the *apparent* extravagance can be explained in few words.

"The course of the Northern Section runs from Tientsin to Techow and from Tonghsien to Hanchwang in the vicinity of, and parallel to, the Grand Canal. This dangerous neighbourhood made itself felt to the engineers when the canal dikes gave way in 1911. In anticipation of such occurrences, the level of the track had everywhere been placed half a meter above the top of the banks of the Canal. To this height, the elevation of the station platform must be added so as to arrive at the level of the groundfloor of the station buildings. It will thus be seen that their foundations had to be very deep or high as one may call it, as they had to be sunk right down to the grown ground, for the reason that the earthwork was newly raised and unsettled and, besides, at any moment exposed to the dissolving and scouring action of floods from the canal. Any attempt at saving in this respect would have impaired the strength of the buildings very seriously.

"Deeper still had the foundations to be sunk on that 50 km. long section of the line which is exposed to the floods of the Hwangho. What was more natural than to use such deep and consequently very strong foundations to erect on them two stories under one roof, instead of having to build for a single storied house equally deep foundations and a roof, but both of double the lengths?

"It was therefore only the wish of economising wherever possible, which caused the Northern Section to erect such high structures.

"The ornamentation of the buildings is of quite a plain character, attained mostly by means of white- and colourwashed plaster work which can be done very cheaply.

"The combination of European and Chinese styles of architecture was the outcome of suggestions made by Lu Hai-huan, who was Director-General at that time.

"The variety in the individual architecture of the buildings may have imposed a certain amount of extra work on the engineers and the chief draughtsman, a call to which they readily answered, but otherwise it did in no way increase the cost of the buildings.

"With such a large undertaking as the Tientsin-Pukow Railway, undoubtedly is, it is a matter of course that the places of importance are rendered conspicuous by means of a superior style of architecture being adopted for their buildings; thus, Tientsin and Tsinanfu were provided with more elaborate edifices containing not only the usual offices and waiting rooms, but also quarters for inspectors.

"In this respect, the Northern Section have only followed the example set by the Peking-Mukden-Line where the stations at Tongshan and Peking have been rendered conspicuous by their ornamental buildings, of the Shanghai-Nanking Line which have made their Shanghai terminus a splendid specimen of magnificent architecture, or of the Southern Section which are erecting an extensive station building on the bank of the Yangtze.

"Finally, the objection has been raised that the handsome buildings on the Northern Section are out of place in surroundings of Chinese mud houses, but people who have found fault with this must be unaware of the fact that trees have been planted everywhere which—when grown up—will form a most suitable background for the buildings, creating the same parklike effects as can be observed when travelling by rail from Tsinanfu to Tsingtau.

"A small quantity of seeds procured from Europe and reared in our own nurseries supplied the necessary trees and shrubs.

"We may just as well take this opportunity to throw some light on the question of the cost of construction on both sections, which appears highly desirable after the FAR EASTERN REVIEW in its January, 1913, issue came out with the alarming statement that the actual cost of the Northern Section is estimated at £3,000 per mile above the cost of the Southern Section.

"That journal refers to the figures supplied by the Engineer-in-chief of the Southern Section and the information given by the Chinese of the Northern Section. According to the figures supplied by the Engineer-in-chief of the Southern Section, the cost of the construction on that section is £9,606 per mile. According to the statement of accounts on November 30th, 1912, as audited and approved

of by the auditor of the German Syndicate, and according further to the attached "Comparison of the nett cost of construction for Northern and Southern Sections," the cost of construction on the Northern Section is £10,473 per mile, including the cost of the Hwangho Bridge. But in order to compare the respective costs of the two sections the cost of the Hwangho Bridge must be entirely eliminated from the calculations, for the reason that there is no equivalent for the same on the Southern Section, and that—through the ignorance of the gentry of the province of Shantung—the width of the bridge spans was foolishly doubled. Thus, the cost per mile of the Northern Section comes to £9,160 per mile, that is to say £446. less than the cost per mile of the Southern Section."

The figures supplied by the German authorities are as follow:

(*See table on this page continued on page 453*)

The Southern Section

Just as the builders of the Northern Section seem to think that the figures already published do not convey a correct view of the costs of the line, and that the description given does not adequately explain the circumstances of construction, so do we find that there are some points connected with the description of the southern section which do not satisfy those interested.

In order to have the matter thoroughly ventilated we publish the following comments from one who has taken an interest in the subject:

"(1) It is stated that private advances of £500,000 have been made to the Northern Section, and of £400,000 to the Southern Section. This misrepresents the state of the finances of the Southern Section, as at the end of last year, that Section had lent £250,000 to the Northern Section, and only borrowed £173,000 to make up for this loan. No money at all need have been borrowed, had it not been for the loan made to the Northern Section. In the same portion of the article, it is mentioned that the Loan was originally to have been £7,500,000. It is true that there was a preliminary estimate of £7,400,000, but this was for a lighter railway, with 60lb. rail and with the cheapest possible equipment. The Chinese Government decided to have a first class line, and the sum of £9,800,000 was the amount considered necessary by the present Engineers-in-chief. This is the total of the only detailed estimates ever made for the Railway, and it has never been altered or amended.

"(2) The first sod of the Southern Section was turned in January, 1909, not October 1908. The Director General absolutely refused to allow any work to be started until he came to Pukow, and cut this sod himself.

"(3) The rails on the Southern Section have not all come from Hanyang. 14,000 tons came from England and 5,000 tons from Russia.

"(4) It is stated that the rolling stock of the Northern Section is more elaborate. This only applies to eight first class cars. The second class cars of the Southern Section are, at least, as good as those of the Northern Section. The third class cars are infinitely better, and the wagons being built of steel, with pressed steel underframe are considered by most Engineers to be superior to the more old-fashioned wagons of the Northern Section, with wooden sides, and built up underframes.

"(5) The ties are not creosoted Oregon pine, over most of the line. Most are Japanese hardwood, but there are also many miles on the Southern Section laid with Tasmanian sleepers, and with Australian Jarrah. Some creosoted Oregon pine sleepers were purchased for the Southern Section, against the advice of the Engineer-in-chief. They have proved quite unsuitable for the heavy traffic, and have already been replaced in very large numbers.

Another Statement

As it is a well-known axiom that figures can be made to prove anything, may not the capital cost of this line be set forth as follows as the simplest method of demonstrating the total cost:

Comparison of the Nett Cost of Construction for Northern and Southern Sections of the Tientsin-Pukow Railway

1. Southern Section.

The Far Eastern Review's article of January, 1913, gives the total amount of Capital received by the Southern Section sufficient to complete the line as	£ 2,635,100.—.—.
To be deducted: nett amount of interest	£ 363,100.—.—.
	£ 2,272,000.—.—.
Length of main line 236½ miles	
nett-cost of construction per mile $\frac{2.272.000}{236.5}$ per mile	£ 9,606.—.—.

2 Northern Section.

Statement of accounts on November 30th, 1912, as audited and approved by the auditor of the syndicate:

CAPITAL AUTHORISED AND RAISED BY DEBENTURE STOCK

							Rate.
Under Loan-Agreement 1908.							
£ 3,150,000.-.-	first issue £ 1,890,000.-.-	93	132,300-.-	£ 1,757,700.-.-	Koop. T.	13,667,058.943	2.6 $\frac{9}{16}$ &c.
	second issue £ 1,260,000.-.-	94½	69,300.-.-	£ 1,190,700.-.-	Koop. T.	9,350,282.166	2.6 $\frac{9}{16}$
Under Supplementary Loan							
Agreement 1910	first issue £1,890,000.-.-	95	94,500.-.-	£ 1,795,500.-.-	Koop. T.	13,157,862.641	2.5¾
	, second issue (£1,410,000.-.-) not issued	—	—	—			—
	£ 5,040,000.-.-		£296,100.-.-	£ 4,743,900.-.-	Koop. T.	36,175,203.750	

TEMPORARY LOANS ON ACCOUNT OF UNISSUED PART OF SUPPLEMENTARY LOAN

				Rate.
Tientsin-Pukow Railway, Southern Section through Hongkong & Shanghai Bank	£ 250,000.-.-	Kooping Taels	1,832,061,075	2.8¾
Deutsch-Asiatische Bank, Berlin .	£ 642,081. 1.8.	Kooping Taels	4,705,327,031	2.8¾
	£ 892,081. 1.8.	Kooping Taels	6,537,388,106	

CAPITAL BALANCE SHEET AT END OF NOVEMBER, 1912

	Taels cts.	Taels cts.
Capital (£4,743,900)		36,175,203.750
Temporary loans (£892,081. 1. 8.)		6,537,388.106
Remuneration to the Syndicate and loan-service-expenses	1,005,174.682	
Deutsch-Asiatische Bank, Tientsin	165,048,891	
" " " , Berlin	190,758.969	
Capital Cash Account	128,655,713	
Interest on loan	6,313,431.676	
Interest (received on Bank Balance)		1,111,517.781
Exchange		72,212.722
Nett-Traffic-income		1,862,344.117
Directorate General, Peking, (advances)	416,228.835	
Transfers Divisional:		
District Tsinanfu	35,610.550	
Telegraph Department	15,195,984	
Brickworks Futsun	2,719.809	
Various creditors (mainly Maschinenfabrik Aug-Nuernberg A. G. due for bridge-work done)		1,068,691.621
Various debtors	9.470.904	
Final Head as per Schedule A.	37,189,873.247	
Suspense Accounts as per Schedule B.	1,355,188.837	
	Koop. T. 46.827,358.097	Koop. T. 46,827,358.097

CAPITAL EXPENDITURE DETAILED SCHEDULE A. OF FINAL HEADS

I.	Land purchase	Kooping Tls.	1,812,065.296
II.	Earthworks, etc.	" "	1,695,247.820
III.	Enclosures, excl. of the stations	" "	3,483.860
IV.	Level crossing	" "	55,151.799
V.	Bridges and passages	" "	7,539,884.966
Va.	Hoangho Bridge	" "	4,564,357.588
VI.	Tunnels	" "	—
VII.	Superstructure on the mainline and on the stations	" "	9,267,846.075
VIII.	Signals and telegraphic signs	" "	571,406.553
IX.	Stations and Buildings.	" "	2,149,471,552
X.	Workshops and Stores	" "	669,296.304
XI.	Extraordinary works	" "	165,664,885
XII.	Rolling Stock	" "	3,936,180.185
XIII.	General Charges	" "	3,368,490.930
XIV.	Extraordinary	" "	319,700.180
XV.	Commission on Purchase	" "	761,518.316
XVI.	Railway Police	" "	310,106.838
	Total	Kooping Tls.	37,189,873.247

Northern Section

Capital raised	£4,743,900
Plus £250,000 borrowed from Southern Section	250,000
	£4,993,900
Plus advances by Deutsche-Asiatic Bank	642,081
	£5,635,981

Mileage of the section 457, equalling £12,332 per mile.

(These figures include interest charges during construction).

Southern Section

Capital raised	£2,786,103
Less £250,000 advanced to Northern Section	250,000
	£2,536,103
Plus advances by Central China Railways, Limited	363,000
	£2,899,103

Mileage of the section 236½, equalling £12,258 per mile.

(These figures include interest charges during construction).

Northern section, per mile ...	£12,332
Southern section, per mile ...	12,258
Southern section, less	74

We are enabled to give still another statement as follows:

Comparison of the cost of construction of the Northern and Southern Sections of the Tientsin-Pukow Railway, based on amounts actually drawn from the Loan Syndicates, etc. to Sept. 30, 1912:—

Northern Section

Amount derived from issue of Bonds	£4,743,900
Amount borrowed from funds of Southern Section	250,000
Amount borrowed from Deutsch Bank, to Novr. 1912	642,081
Sundry creditors, Kuping Taels 1,068,691. Say	140,600
Total expenditure to November 30, 1912	£5,776,581.

Length of Northern Section in operation, is according to working time table, 430 miles. According to a statement published it is 457 miles, which length probably includes some service line.

If 430 miles, the cost per mile works out at £13,430 per mile.

If 457 miles, the cost per mile works out at £12,640 per mile.

The above amounts include interest paid on capital, and no account has been taken of traffic earnings which have been used for construction.

Southern Section

Amount derived from issue of bonds	£2,712,100
Less loan made to Northern Section	250,000
Balance	£2,462,100
Advances from Loan Syndicate to September 30, 1912	173,000
Total Amount actually received	£2,635,100
Less Cash balances in Banks	106,278
Actual amount of capital expended to September 30, 1912	£2,528,822

Length of Southern Section in operation, according to working time table is 236½ miles, and cost per mile therefore works out at £10,692 per mile, including interest. As in the case of the Northern Section, no account has been taken of traffic earnings.

SCHEDULE B. SUSPENSE ACCOUNTS

Purchase	Kooping	Taels	3,849.505
Head Store	,,	,,	221,582.488
Store Tsinanfu	,,	,,	1,095,818.107
Stores Divisional	,,	,,	910.424
Miscellaneous Advances	,,	,,	11,413.836
Printing and Stationery	,,	,,	7,928.317
Fuel and Oil Account	,,	,,	13,686.160
	Kooping	Taels	1,355,188.837

Capital Expenditure on November 30th, 1912, as above	Kooping	Taels	37,189,873.247
To be added:			
Advances debitable to Capital Expenditure	,,	,,	11,413.836
Printing and Stationery	,,	,,	7,928.317
Stores issued, but not accounted for appr.	,,	,,	550,000.000
Funds needed to complete the line appr.	,,	,,	500,000.000
Total approximate cost inclusive of Hoangho Bridge	,,	,,	38,259,214.000
Less:			
Traffic income Northern Section	,,	,,	1,862,344.000
(Traffic-income in Southern Section has been used for construction purposes but has not been accounted for therefore the total cost of construction of Southern Section is increased by the sum of traffic-receipts)			
	Kooping	Taels	36,396,870.000
Less:			
Hoangho-Bridge	,,	,,	4,564,358.000
Total approximate cost of line excl. of Hoangho Bridge	Kooping	Taels	31,832,512.000

Length of line 457 miles or

per mile	Kooping Tls. 79,643.000	incl. of cost of Hoangho Bridge
(average rate of exchange) @ $2.7\frac{9}{16}$ =	£ 10,473.-. -	
(as before) per mile	Kooping Tls. 69,655.000	excl. of cost of Hoangho Bridge
(average rate of exchange) @ $2.7\frac{9}{16}$ =	£ 9,100.-. -	

SOUTHERN SECTION	£ 9,606.-.-
NORTHERN SECTION	£ 9,160.-.-
SOUTHERN SECTION MORE	£ 446.-.-

NEW PHILIPPINES ARMY COLLIER

The Shanghai Dock and Engineering Company were the successful tenderers for the building of a New army collier, which is to be the finest and most complete vessel of the type ever launched. The chief of the quartermaster's corps in the division of the Philippines, Colonel Isaac W. Littell, awarded the contract to the Shanghai Dock and Engineering Company, which has been entrusted in the past with much important work for the Insular Government, all of which was performed expeditiously and thoroughly satisfactorily.

The collier is to cost P.742,000 and is to be delivered in sixteen months time from the seventh of February. The vessel will be fitted with hydraulic pressure loading and discharging equipment, capable of handling 600 tons of coal an hour, with automatic weighing machines.

The specifications call for a single screw self-propelling steel collier, 362 feet over all. 35 feet between perpendiculars, 50 feet breadth moulded, a depth moulded of 20 feet and 6,000 tons dead weight carrying capacity.

The new collier will be fitted with one set of direct acting vertical two crank compound surface condensing engines, four coal elevators, each capable of discharging 150 tons an hour, four continuous automatic weighing machines for the elevators and one coal conveyor, capable of discharging at a height of 50 feet above the water level when the collier is at loaded draft, a surface condensing plant for auxiliary propelling machinery and other auxiliary machines, one centrifugal circulating pump and one Edwardes type air pump of ample size for all requirements, independent steam pumps, steam turbine electric lighting plant, a cylindrica multitublar boiler of ample size for all requirements, etc.

In either discharging or loading the coal will be lifted by the hydraulic pressure devices and conveyed through shoots from one vessel to another.

The last ship building contract awarded to the Shanghai Dock and Engineering Company by the U.S. army was for the transport Merritt completed last spring and now running in the inter-island service. The Merritt was the largest vessel turned out at Shanghai up to that time.

Bank of Japan

At the sixty-first general meeting of the Bank of Japan, the following plan of accounts and distribution was unanimously adopted:

	Yen
Net gain for the term	2,937,239
Balance brought over from the previous term	1,699,373
Total	4,636,612
This was distributed as follows:	
Dividend on old shares (6% per annum)	900,000
Dividend on new shares (6% per annum)	225,000
Reserve	300,000
Sinking funds	10,000
Bonus to officials	181,000
Second dividend on old shares (6% per annum)	900,000
Second dividend on new shares (6% per annum)	225,000
Balance carrried forward to next accounts	1,895,612

THE HU-KUANG LINES

REVISION OF THE AGREEMENT

Unless unforeseen difficulties arise work on the construction of what are known as the Hu-kuang railway lines will be simultaneously proceeding very shortly. According to the agreement come to on May 20, 1911, a five per cent. gold loan of £6,000,000 was floated to:

(1) "Redeem certain unredeemed gold bonds to the total par value of gold $2,222,000, issued by the American China Development Company on behalf of the Imperial Chinese Government, and

(2) "For the construction of a Government railway main line from Wuchang, the capital of the Hupeh province, through Yo-chou and Changsha, the capital of Honan province, to a point in the district of Yi chang-hsien, in the prefecture of Ch'en-chou, of the southern boundary of Hunan, connecting with the Kwangtung section of the Canton-Hankow railway line, the total length of this line, to be known as the 'The Hupeh-Hunan section of the Canton-Hankow railway line,' being an estimated distance of 1,800 Chinese *li*, or 900 kilometres, and of

"A Government railway main line from a point at or near Kunhshui, in the province of Hupeh, connecting with the Hankow railway line, and passing through Hsiangyang, and Chingmenchou to Ichang, an estimated distance of 1,200 Chinese *li*, or 600 kilometres; and from Ichang to Kueichoufu in the Province of Szechuan, an estimated distance of 600 Chinese *li*, or 300 kilometres—this latter section of the line having been added in substitution for the branch line from Chingmenchou to Hanyang originally agreed upon—the total length of this main line, to be known as 'The Hupeh section of the Szechuan-Hankow railway line,' being about 1,800 Chinese *li*, or 900 kilometres."

The agreement provided that after the deduction of the amount required for the redemption of the gold bonds the balance of the loan proceeds should be devoted to the construction of the railway lines above mentioned—including the purchase of land, rolling stock and other equipment—to the working of the lines, and to payment of interest on the loan during the period of construction, which is estimated at three years from the actual beginning of the works, a longer period, however, being allowed for the completion of the section from Ichang to Kueichoufu in consideration of the engineering difficulties to be encountered.

The agreement provided for simultaneous commencement of work at Wuchang, Changsha, Kuang-shui and Ichang within six months after the signing of the agreement, but the outbreak of the revolution in October completely blocked the preparations that were begun after the flotation of the loan

The engineer for the British section (Mr. A. H. Collinson) had been appointed and was actually in the country with a staff engaged on survey work when news of the revolution reached him. He had with him a bodyguard of troops, but they were so frightened by the reports traveling down the country that they would have deserted him had he not held complete command over them. The incident is mentioned merely to indicate that the soldiers agreed to return with the engineer and his party to Wuchang if *he* would give them protection! A case of one white man, who originally set out to be guarded by a squad of soldiers, being trusted and depended upon by the soldiers to guard them from their own countrymen!

The revolution completely obstructed progress, and was responsible for the introduction of other factors which necessitated reconsideration of some points in the agreement, the bankers deeming it advisable to have the security revised, the arrangements for the banking of funds reconsidered, and a change instituted with regard to the auditors. These matters took considerable time to adjust, and it was not until recently that a settlement satisfactory to both the Board of Communications and the Bankers was come to.

In the agreement it was stipulated that the security for the loan should be the general likin of Hupeh province, amounting to Taels 2,000,000 per year; the Hupeh additional salt tax for river defence amounting to Taels 400,000 per year; the Hupeh new additional two cash salt tax of September 1908, amounting to Taels 250,000 per year, the Hupeh collection of Hukuang inter-provincial tax on imported rice, to the amount of Taels 250,000 per year; the general likin of Hunan amounting to Taels 2,000,000 per year; the Hunan Salt Commissioner's Treasury regular salt likin, to the amount of Taels 250,000 per year, in all amounting to Taels 5,200,000 per year.

At the time the agreement was being negotiated an effort was made to have the

TSEN CHUN-HSUAN,
New Director of the Hu-kuang Lines

railway lines to be built pledged as collateral security, but the authorities resisted overtures in this regard chiefly owing to the popular opposition to placing what are described as "sovereign rights" in the hands of foreigners. The revolution produced such changes in the value of the security already pledged, however, that reconsideration was necessary. One of the first steps to be taken by the revolutionists was to declare the abolition of likin, and though that was eventually revised likin collections fell off almost entirely as a result of the dislocation of the machinery of tax collection. Other revenues pledged also suffered, and the aftermath of the revolution was such as to persuade the foreign bankers that they would be unwise to allow the money raised by the issue of bonds to leave the foreign banks in which it was deposited without additional security and safeguards. Therefore, negotiations were re-opened with the Minister of Communications to obtain additional security The Government protested that the taxes were unaffected, but after much argument it was agreed that the property and materials of the lines should be specially given as a provisional guarantee that the likin was unimpaired.

In Article 14 of the agreement it was stipulated that the transferred funds to the extent of one-half of the net balance of the loan proceeds may, at the discretion of the Ministry of Posts and Communications, be deposited with the Bank of Communications (Chiao-tung Bank) and/or with the Taching Government Bank, the Imperial Chinese Government declaring itself responsible for all the funds of the loan deposited with those banks.

The revolution, of course, not only removed the Imperial Chinese Government, but it also seriously affected the credit of all native banks, including the two which to a greater or less extent enjoyed the advantage of Government backing. Both banks were affected by the financial crisis that followed the outbreak of hostilities between the revolutionists and Imperialists, and as the Government since the declaration of peace has not managed to put the Treasury in order the foreign bankers responsible for the loan funds were loth to agree to any transfers of loan funds to banks which they considered to be unsound. The discussion on this delicate point lasted for some time before a decision could be reached, the Minister of Communications declining to admit that the banks were unsound. However, it was pointed out that the banks were not doing their usual business with foreign banks because of their inability to do so, and the Minister reluctantly agreed.

It was then decided that the loan funds shall be deposited temporarily with the Deutsch-Asiatic Bank, the Hongkong and Shanghai Banking Corporation, the Banque de l'Indo-Chine, and the International Bank in readiness to be drawn from time to time as required for the work until such time as either the Chiao-tung Bank or the Taching Bank has been reorganised as a State Bank of China and has established its credit, and business relations with foreign banks have been mutually resumed. When such time comes the Government may consult with the Groups as to a reversion to the methods of transfer laid down in Article 14 of the Agreement by which the deposits of the proceeds of the loan funds shall be shared with the Chiao-tung Bank or the State Bank of China as agents.

Another point upon which serious thought had to be given by the Ministry was one raised in connection with the keeping of accounts. Article 14 of the loan agreement sets out that auditors are to be engaged by the banks for the inspection of accounts. Any requisitions for money upon the Construction Accounts in the banks must be passed by the Auditor before the amount can be drawn, and the Auditor, should he find that there are any irregularities in the payments to be made, may "in the first place ask the Managing Director for specific explanations, and if the Managing Director is unable to furnish definite explanations, the Auditor may refer the matter to the Ministry of Posts and Communications for its instructions."

The agreement also stipulated for the accounts to be kept in Chinese and English in accordance with accepted modern methods, to be supported by all necessary vouchers. Such accounts and vouchers were to be open for inspection, at any time during the period of construction, by the Auditors.

This was not deemed by the banks to be sufficient safeguard in view of the altered conditions in the country, and they pressed in addition for the appointment of qualified accountants.

The Ministry of Communications ultimately agreed that as China was actuated by a desire to have accounts kept so that they should be clear for auditing she would herself forthwith engage experienced foreign accountants whose executive power and appointment to the various railway sections shall be entirely and exclusively controlled by the power of engaging or dismissing the accountants, such appointments to be made by the Chinese Government and to have no concern whatever with the loan agreement.

The Board further consented to the members of the Banks' staffs in Hongkong acting provisionally as Auditors, pending the appointment of others.

The bankers also deemed it advisable to have adequate provision made for the supervision of materials, and it was ultimately decided that proper arrangements would have to be made for the control of material during the period of construction. It was therefore agreed that the Managing Director of the Railway and the Engineer-in-Chief should select a foreign engineer to be stationed at the store yards to control, supervise, and keep records, and in the event of damage, loss, or misuse the Managing Director and the Engineer-in-chief should be responsible.

In accordance with the provisions in the agreement the two lines of railway constructed between Changsha and Chuchow, in Hunan, and the sixteen miles built from Ichang, in Hupeh, together with the property of the two private companies concerned, have been taken over by the Government and will be included in the systems to be constructed. Both were described in the January number of the FAR EASTERN REVIEW and further reference to them is not called for here.

The foreign Engineers-in-chief called for by the Agreement have also been appointed. Article 17 provides that "The construction and control of the railway lines shall be entirely and exclusively vested in the Imperial Chinese Government, who, for the work of construction, will select for appointment a fully qualified British Engineer-in-chief for the Hupeh-Hunan section, from Wuchang to Yichanghsien; a fully qualified German Engineer-in-chief for the Kuangshui-Ichang section of the Szechuan-Hankow line, and a fully qualified American Engineer-in-chief for the section of that line from Ichang to Kueichow-fu.

The Engineers-in-chief are to be under the orders of the Chinese Director-General and the Chinese Managing Directors of the respective lines, or in their absence, of their duly qualified representatives, and will carry out all the wishes of the Ministry of Communications with regard to the plan of construction of the lines. Whenever appointments are to be made or functions defined of the technical members of the railway staff, as well as in the case of heir dismissal, the Director-General, the Managing Director, or their duly authorised representative, will act in consultation with the Engineer-in-chief concerned, and in case of disagreement the matter will be referred to the Ministry of Posts and Communications, whose decision shall be final.

The three foreign engineers have now been appointed. They are:

- Mr. A. H. Collinson, in charge of the work on the British section.
- Mr. Linow, who was assistant to the Engineer-in-chief of the Northern Section of the Tientsin-Pukow line, in charge of the German section of the Szechuan-Hankow railway.
- Mr. Frank Beckwith, recently arrived in Peking from America, in charge of the American section from Ichang to Kweichow-fu.

The Chinese Director-General of the lines was recently appointed, the post being finally given to Tsen Chun-hsuan, who was a well-known official in the old regime, and was at one time Viceroy of the two Kwang provinces. The appointment of this official came as a result of the resignation of General Huang Hsin, who was previously appointed to the post.

The seal of office was specially conveyed to Shanghai to be delivered to Tsen Chun-hsuan. and having accepted it he immediately made preparations to journey to Peking. It is interesting to note in connection with the appointment of this official, that he was appointed just before the revolution to go to Szechuan to pacify the people who were agitating against nationalisation of railways. The late Tuan Fang had gone ahead of him on a similar mission, and was decapitated by his soldiers. Tsen Chun-hsuan only got as far as Wuchang, and was resting there when the revolution broke out. In disguise he fled the city and reaching Hankow, eventually made his way safely back to Shanghai.

MR. FRANK BECKWITH, ENGINEER-IN-CHIEF, AMERICAN SECTION, HANKOW-SZECHUAN RAILWAY

The Managing-Director of the British section is Mr. C. C. Yen, brother of Mr. W. W. Yen, who is en route to Germany to take up the post of Chinese Minister to Berlin, but the Managing Directors for the other two sections have not so far been appointed.

THE AMERICAN ENGINEER

MR. FRANK BECKWITH

Mr. Frank Beckwith, the engineer appointed to take charge of the American section of the Hankow-Szechuan railway, arrived in Peking recently, and waited there pending the settlement of affairs to enable him to proceed to Ichang, where he will commence his work. Mr. Beckwith brings with him to China valuable experience in railway building, and his record shows that he is familiar with the problems which will confront him in Szechuan so far as heavy engineering difficulties are concerned. The section of the line which he will have to build is the most difficult connected with the system to be constructed with the Hukuang loan funds.

Mr. Beckwith was born in Quincy, Illinois, on November 8, 1869. He graduated at the University of Illinois, in Civil Engineering, and later joined the Engineering department of the C. B. & Q. R R. where, from 1892 to 1903, he worked at bridge designing, interlocking, signal work, railway location and construction. Prior to this, however, he had had experience on the Mississippi River improvement works, in dredging and dams construction, under E. H. Ruffner, Capt. of Engineers of U. S. A. He was ultimately Resident Engineer on construction of the Mississippi River Bridge, at Quincy, Ill., and also the new freight and passenger terminals at that point.

In 1899 he took charge, as Engineer of the Iowa lines C. B. & Q. R. R., of relocation and reconstruction of the main line across Iowa, which included one of the heaviest pieces of steam shovel work which has been done in the United States. Mr. Beckwith was for four and a half years in charge of this work, which cost \$13,000,000 (gold). Between 1903-6 he was the principal Assistant Engineer and Bridge Engineer of the Lake Shore and Michigan Ry., Cleveland, Ohio, during which time the Company spent \$20,000,000 (gold) for new main and yard tracks, round houses, shops, coal docks, water plants, etc.

In 1906-7 he was General Superintendent and Chief Engineer of the New York Central Line Belt Lines, 600 miles, terminals around Chicago, Ill., and designed and constructed \$1,500,000 of improvements, among them the big terminal yard at Gibson, Ind. Between 1907-9 he was with the Northern Pacific Ry. in charge of line and grade revision, as well as the double tracking of the road from Garrison to Missoula, tunnelling in the Rocky Mountains, taking out heavy rock cuts, building foundations for bridges in swift streams, etc. Between 1909-1911 he was building railways in various parts of the States for the Walsh Construction Co., Davenport, Iowa.

NATIONALISATION OF THE SZECHUAN LINE

AGREEMENT FOR THE TRANSFER

The following is a translation of the agreement made between the Department of Communications and the Szechuan-Hankow Railway Company re the taking over of the Szechuan-Hankow Railway by the Department of Communications.

Liu Sun-yuan (hereinafter to be called the representative) acting as representative of the Szechuan-Hankow Railway Company (hereinafter to be called the Company) has received full powers from the whole body of shareholders of the said Company, to confer with the Department of Communications (hereinafter to be called the Department) regarding the nationalization of the said railway, and have agreed as follows:—

1.—The construction work, machinery, workshop, and land, etc., of the whole Ichang-Wanhsien section of the Szechuan-Hankow Railway shall be handed over to the Government, as agreed upon by the whole body of shareholders of the Company, and all other sections of the Szechuan-Hankow Railway (from Chengtu to Wanhsien) shall also be handed over to the Government; but in the future, if the Government alters the location of the railway, in such a way that this railway is not made a trunk line, excepting the Ichang-Wanhsien section, all other sections shall be constructed by the Company.

2.—All cash funds of the Company shall be retained by the Company to be used for other

industrial purposes, such cash funds are of the following description: those that are deposited with the Bank of Communications, the Hanyang Iron Works, the Cement Company, and all the cash funds of the Company deposited in Shanghai, Hankow, Chungking, Chengtu. In addition, the machinery and workshop, land and all other appended property, of the Copper Mint of Chengtu, shall also be taken over by the Company, and the Government shall undertake to pay to the Company all such funds as were loaned to the Bank of Communications, and advances which were made to the Hanyang Iron Works.

3.—Regarding the public Loan Bonds issued for the payment of construction work on the Ichang-Wanhsien section, the outstanding debts on account of materials bought from the various foreign Companies, and the loan of the Hupeh Army's Payment Bureau Loan (the above three items amounting to about over Tls.900,000) it is agreed that the said bonds shall be redeemed by the Government, the outstanding accounts with the various foreign Companies shall be settled by the Government, and the Hupeh Army Payment Bureau Loan shall be dealt with by the Company.

4.—The Department shall issue promissory Notes to the Company to reimburse all direct and indirect expenditure incurred on construction work by the Company: expenditure directly or indirectly incurred by the Company, and, beginning on the date when the railway is taken over by the Government, an annual interest of 6% shall be paid on this reimbursement due to the Company; the interest shall be paid to the Company once a year. All expenditure on construction work directly incurred by the Company up to the end of the eighth month of the first year of the Republic (August 31, 1912) shall be paid to the Company in instalments, within ten years; all expenditure on construction work indirectly incurred by the Company, such as interest on shares, salaries, students' tuition, etc., shall be reimbursed to the Company in instalments within five years, beginning on the eleventh year after the taking over of the railway by the Government, the different items being detailed in a separate statement. All the interest on shares due to shareholders before the taking over of the railway, shall be reckoned as indirect expenditure. All the direct and indirect expenditure shall be calculated according to the records of the Szechuan Railway Company Shareholders' Meeting and the records kept by the Department of Posts and Communications of the former Tsing Dynasty. All direct expenditure shall be calculated jointly by a specially appointed officer of the Department and the Manager of the Company at Ichang; the indirect expenditure shall be calculated jointly by a specially appointed officer of the Department and the Head Office of the Company at Chengtu, so that the railway may be properly handed over. All expenditure that has no bearing on the railway work either directly or indirectly, shall not be taken into account.

5.—All bankrupt accounts at Shanghai shall be attended to by the Company, and the Government shall assist in the collection of such accounts.

6.—If in the future the Szechuan-Canton-Hankow General Railway Company be organized, holders of the Promissory Notes mentioned in Article 4 shall be free to exchange such Promissory Notes for share certificates of this General Railway Company.

7.—All detail procedures for the carrying out of the above articles shall be further discussed by the representative with the Department.

To insure quick transmission of news General Hsiung Hsi-ling has ordered the installation of telegraph connections at Linhsi and Waichang, and all other places where wire connection is not in good order. At important intervals branch telegraph offices are to be established, to keep watch on the line.

General Hsiung Hsi-ling has requested the Government to send engineers to make a survey, and make preparations to build the Peking-Jehol light Railway.

Railways in Kwangtung

In Canton there are the Canton-Hankow, the Hsin-Ning, the Kowlung-Canton, the Samshui, and the Chaochow-Swatow Lines, beside the proposed Huichow-Chaochow and the Canton-Macao Railways. The following shows the conditions of the various lines:—

The Canton-Hankow Railway is opened to Lienkiangkou, a point seventy-five miles from Canton. At present owing to the lack of funds, a fifteen mile section between Lienkiangkou and Yingteh, the construction of which was started in May, last year, had been completed at the end of last month. This will be opened to traffic as soon as the iron bridge over the Wengyuanho River extending for the length of 750 ft. is completed.

On account of the unquiet conditions then prevailing in Canton, when shareholders were called to pay in the third installment, few responded. But since then, order having been restored money began to pour in, and half a million dollars are said to have already been got together. As to the source, whence came four hundred fifty thousand dollars paid to Great Britain as the principal and interest of a loan during last July, reports vary, some saying that the company itself disbursed the amount, while others say that the local government paid in its place.

A new elegant office has been constructed near Huangsha Station with a sum of one hundred thousand dollars realized through the sale of the old office in the City.

The construction of a section for nearly 25 miles between Niuwan opposite of Kungi and Kongmoon via Hsinhui on the Hsin-Ning Railway was started in October, 1909, and was opened to traffic in October, 1911. A distance of 3 miles from Kongmoon to Peichiehkow will be ready for traffic soon. Tracks are already laid from Kungi up to Toushan, but from Toushan to Sanchiahai the work is not completed.

No bridge is built across the Niuwanho, a river flowing between Niuwan and Kungi, crossing is intended to be made by means of a ferry boat. This boat was made at Hongkoag at the cost of $220,000, and although it is in serviceable condition it is not used for some reason. Travellers are now obliged to take a small steamer at Niuwan, and after landing at Kungi walk about one mile to get in a train waiting for them at the opposite side. 13 engines, 73 passenger coaches and 155 goods cars are employed on this line. The income of the line amounts to something like 15,000 dollars per month, which comes to about 4% profit on $4,450,000, the total amount invested for the enterprise. Districts around Hsinning being populated with well-to-do people, who amassed comfortable fortunes abroad, the line is liberally patronized by passengers, but production being limited to rice and oranges, freight traffic is inconsiderable.

No special development has been made on the Kowloon-Canton Railway, with the exception that Great Britain bought a tract of land comprising about 340,000 sq. ft. last June at the cost of $1,762,615 to prepare for the expansion of Kowloon Station when the Canton-Hankow Line is completed. Nothing particular to mention has transpired on the Samshui and the Chaochow-Swatow Railways.

Prior to the Revolution, construction was started on the section for sixty miles between Fangtsun opposite to Canton, and Hsiangshan on the Canton-Macao Line, with a capital of six million dollars, but it was abandoned on account of the disturbance. During last November, however, Mr. Liang Yunykuei, a cousin of Mr. Liang Tung-yen and one of the promoters, returned from Peking with necessary permission to proceed with the work, and is now taking up subscriptions. Mr. Liu Yaoting, former engineer of the Kirin-Changchun Line, is expected to be engaged in the capacity of Chief Engineer.

All the shares of the Huichow-Chaochow Railway have been subscribed. The promoters are scheming to organize a railway bank with the money thus raised, together with a sum of ten million dollars to be borrowed from an American capitalist. One half of the loan is understood to be furnished in the shape of railway materials, the whole loan being secured by the property of the line.—*China Tribune.*

Peking-Kalgan Line

The Peking-Kalgan Railway continues to prove its value to the Chinese Government as a profit-earning medium. It is the pioneer of railways built with Chinese capital and operated by Chinese engineers and that its business continues to increase, considering the heavy grades and great cost of negotiating the Nankou Pass, speaks volumes for the capacity of those who are in control. The unusually high gradients not only compel a heavy fuel consumption but also demand good train crews.

The total distance now covered by the line is 141 miles. It was originally built more with a view of its strategic value than with the idea of developing commerce, but its effectiveness in opening up the rich grain producing areas of the table-land has surprised even the most sanguine of its original advocates.

The capital outlay of the line was Taels 6,935,086, and, as will be seen from the following table, the yearly gross income has shown a steady increase, and the cost of working a substantial decrease:

1st year (from opening date to end of year, 4 months)	$ 476,441.59
2nd year (12 months)	1,320,632.40
3rd year (12 months, and 25 days, intercalary month included) ..	1,629,050.36

During last year, linseed began to come in from outlying districts, and, as the seed has found such a good market, the export has gone up by leaps and bounds. From this source alone the freight has profited immensely. The following table will give a general idea of the present earning power of the line. When the extension to Tatung has been completed thus opening up rich coal fields as well as a large agricultural and pastoral area, the line should prove one of the most profitable in the country.

	Passengers	Goods	Total
February	$ 15,544.75	60,885.04	
March	35,854.70	133,797.80	
April	44,687.20	201,228.60	
May	48,050.25	252,353.02	
June	40,188.55	178,780.71	
July	35,640.35	110,163.44	
August	47,129.05	109,350.54	
September	44,873.70	107,298.47	
October	49,189.60	140,450.48	
November	50,618.75	144,305.62	
December	47,855.69	173,633.97	
Total for 10 months and 17 days	$459,632.59	1,612,247.69	
Plus-military traffic	$ 66,444.94	——	
Total	$526,077.53	$1,612,247.69	$2,138,325.22

The working expenses of the line are being greatly reduced, and the following table will show the ratio:

	Ratio
1st year from opening date to end of year, 4 months..	168.45%
2nd year	94.32%
3rd year	60.12%
4th year, 1st year of China Republic (1912)	36.76%

Had the revolution of 1911-12 not compelled a discontinuance of work on the extension of the line to Tatung that city would now have been connected with the capital.

Within recent months work has been resumed, and about ten miles of earthwork have been finished and is now ready for the rails. Although the country is suffering from a dire shortage of money the Government has sanctioned the construction of the line as far as Tatung-fu, and by the end of this year it is hoped trains will be running there.

Survey will be continued to Kwei Hua-ching, the neighbhouring city of Sui-yuen, where it was originally introduced to run the line. The change has been decided upon merely because Kwei Hua-ching is a market town. Sui-yuen is the old city, but is only a few miles away from the former place. When Tatung is reached the line will be located to the market town of Feng Chen some 32 miles further on.

Only 26 miles now separate rail head from Tatung, but the work will be heavy. At Tatung a river has to be crossed, and tenders have recently been opened for the bridge to cross that stream. The bridge will be one of twenty spans of one hundred feet each. The specifications call for a Pratt truss deck girder bridge, on concrete pillars.

The maintenance of the whole line from Peking has been well kept up during the year and an eye is being constantly kept on the rolling stock, steps being taken to replenish stock as demand increases. Ten locos were purchased last year.

Some striking facts illustrative of the development of the country through which this line passed, and of the creation of a great trade in linseed, are given by the *China Tribune*, as follow:

Whilst disquieting rumors were in circulation as to the possible outbreak of a revolution in China some years ago, work was going on to contruct a line starting from Kalgan and reaching either Maimaicheng or Suiyuancheng by passing through the north-western portion of Shansi, and a section between Kalgan and Yangkao for 100 *li* was completed and opened to traffic in the winter of 1911, immediately after the uprising had taken place at Wuchang. It is impossible to imagine what a splendid effect this short line has produced upon the various places along the road and what amount of activity it has stirred up in the grain market of the district as well as the country lying far out beyond the Great Wall.

In the days when this railway was not in existence, places such as Huaian, Chaikoupu, Yangkao or Fengchen located at the outside of the Wall were small villages of no importance. But within six months after the restoration of peace these hamlets suddenly developed into thriving towns. Now, travelers will notice, as they take a trip on the line, mountains of oat, barley, wheat, millet, and kaoliang ready to be shipped to Peking, and rapeseed and linseed to be exported from Tientsin, piled up at every station, and scores of Chinese forwarding agencies established thereat. The greatest activity is displayed in linseed transactions, an article of exportation discovered only in recent years.

The northern part of Shansi and the district beyond the Great Wall adjacent to that Province have been noted for the production of cereals. From time immemorial, the overproduction of yumai (oat), barley, wheat, hsiaomi (millet), kaoliang, beans, together with rapeseed, linseed and flaxseed, was shipped to Kalgan, Peking, Tientsin, etc. The soil thereabout being particularly suited to the cultivation of linseed, an enormous quantity of it was raised. It was estimated that its annual yield at places around Fengchen and Yangkao reached nearly one million piculs. And yet up to the fall of 1911, the article was never thought to be of any value except extracting oil out of it to be used for culinary and lighting purposes.

Those who first found out that there is a market in foreign countries for Shansi linseed were Japanese merchants. When the section of the railway between Kalgan and Chaikoupu was opened to traffic prior to the outbreak of the Revolution in 1911, the Mitsui Bussan and Gisel & Co. despatched men thither and started to buy the article. As no one beside them knew anything about it, they met no competition and were able to purchase any amount of the finest goods as a very moderate price. Many contracts were made, and bargain money was paid. But before they could ship the goods, the effect of the disturbance was felt even in that remote quarter. Railway transportation was suspended; remittance of money became impossible. Under the circumstances, the two firms were compelled to cancel the contracts at a heavy loss.

When peace was restored, foreign merchants at Tientsin, who had heard of the abundance of linseed in the northern part of Shansi, lost no time in sending their buyers to Kalgan and began to buy it. As the number of buyers increased, competition became keener, with the result that the price soared up and the supply became scarce. The price of the best quality which was Fengping Taels 1.20 per picul at the beginning is now more than doubled The present estimated cost laid down at Tientsin is Tls. 3.38.

The Sinyang-Pukow Line

Efforts are being made to try and effect an agreement for the construction of what is called the Pukow-Sinyang railway. The right to build this line was granted some years ago to the British and Chinese Corporation. That organisation is now endeavoring to negotiate an agreement with the Minister of Posts and Communications, but it is not likely that Pukow will be one of the connections. It is probable that the line will connect the Peking-Hankow line and the Tientsin-Pukow line with Sinyang as the junction on the one side, and a spot to be selected almost opposite as the junction on the other.

Mr. Shen Yen-pai was appointed some time ago to discuss matters with the Corporation, and already an engineer has been sent to investigate probable routes.

We understand that Mr. Bourne, who was connected with the Tientsin-Pukow line (southern section) will be the Engineer-in-chief of this proposed line, when it is decided upon.

Kiaochow-Yichowfu Railway

In the 24th year of Kuang Hsu an agreement was made between China and Germany to build the Kiaochow-Yichowfu Railway jointly. As China had no money the proposal was indefinitely put off but recently the Chinese Foreign Office received from the German Minister a note to the following effect: (1) China shall give permission to Germany to build the Kiaochow-Yichowfu Railway, passing and connect with the Tsinanfu railway. (2) Within thirty *li* of the line the Germans shall have control of mining.

The Minister of Foreign Affairs has conferred with the Minister of Communications about this and they are devising means to build the line jointly with Germany and also will try to effect some changes in the Agreement.

The German Minister visited the Chinese Foreign Office recently with regard to this matter and intimated that if a decision was not come to within eighteen days Germany would proceed with the building of the line.

Shenchow-Changteh Railway

The Chinese Government has received a report from Hunan Tutu Tan with regard to the loan for the proposed Shenchow-Changteh Railway in Hunan. The report stated that the Hunan Railway Company had approached a certain British Company for a loan of Tls. 10,000,000 for the construction of the section from Shenchow-fu to Changteh, and the negotiations had been successful, the articles being generally fair and acceptable. The two parties had now decided every point, and the British Company would soon send an engineer to inspect the proposed line. If he reports that the railway may be profitable, the Company will advance Taels 4,000,000 as a first instalment. The Government has sanctioned this step, but has wired the Hunan Tutu to instruct the Hunan Railway Company to refer the Agreement to the Government for approval before it is signed.

Both Changteh-fu and Shenchow-fu are on the Yuan-kiang, which rises in Kweichow province, in the west, and flows into the Tungting lake. The proposed railway will traverse the valley of this river, which at present serves as the chief means of distribution of merchandise received at Changteh. The river is, however, difficult of navigation. Rapids commence 35 miles above Changteh-fu and render navigation rather hazardous. Nevertheless, thousands of small boats traffic unceasingly upon its waters and those of its principal affluents, even up to Kweichow, and to the southeast of Szechuan. The proposed railway would facilitate the handling of all the products of the region, which is well populated.

Changteh-fu has a population of some 300,000 and is situated near the mouth of the Yuan river. It is the great central mart of northwest Hunan. It exports to Kweichow and Szechuan cotton yarn and piece goods from Hupeh, also foreign made cotton goods; it imports from Hupeh and Hunan, salt, oils and varnish, and in the old days used to be the centre of a trade in opium. The general articles of export of the province of Hunan are coal, tea, wood, pottery and bricks, silver, antimony ore, hemp, hides, beans and preserved eggs. The imports are cottons and woollens, copper, salt, sugar and petroleum. The commercial movement of the province is important. Through the canal of Yochow-fu alone the annual number of junks sailing to the interior reaches 26,000. Coal, which constitutes the principal wealth of the province, is found in abundance, though it is chiefly extracted at Pingsiang, across the border in Kiangsi. The largest coal beds are in the south, whence it is carried by junks even as far as Shanghai.

Proposed Nanking-Changsha Line. Li K'in-hsi and Yang Sz-ji have forwarded a statement to the President and the Department of Communications giving in detail the scheme for floating a loan to construct a railway from Nanking to Changsha. They state that this railway will start from Nanking, passing through Anhui and Kiangsi to Changsha, in Hunan As these four provinces are very prosperous they believe that the line will be highly useful and profitable This proposal is now under consideration by the Department of Communications.

Mukden-Jehol Railway.—The Mukden Tutu received a telegram from Tartar-General Hsiung Hsi-ling to the effect that as rapid transit is absolutely necessary to ensure the success of the Mongolian expedition, a railway be built from Mukden to Jehol. Besides serving as a military transportation medium, the railway is also needed for commercial purposes, and it will greatly facilitate the communication between the two places. The telegram further states that he, General Hsiung, has already asked the Central Government to sanction this step to facilitate military operation, and asks if the Mukden Tutu would join in with him.

Nanchang-Kiukiang Railway.—The work of construction of the railway between Nanchang and Kiukiang in Kiangsi province has begun again and a contractor is wanted to build the line from Tehan onwards.

The Shantung Railway.—The receipts of the Shantung Railway Company for the year 1912 amounted to $3,496,000, or $715,000 more than in 1911.

The reward of £3,000 offered for the best design for the new Howrah Bridge has after all gone to the German Company "Maschinenfabrik Augsberg Nurnberg" which the Committee of Engineers pronounced superior to the rest of the designs submitted. The Port Commissioners, subsequent to the decision of the Committee, so altered the conditions that the German Company's design no longer complied with them, but it was generally felt that the "Maschinenfabrik" had squarely won the prize. This has now been confirmed by the Port Commissioners who at their last meeting passed the following resolution: "That the prize of £3,000 be awarded to the Maschinenfabrik Augsburg Nurnberg A. G."

PROPOSED NANCHANG-PINGSIANG RAILWAY

An office has now been erected at Nanchang, in Kiangsi, to house those concerned in the proposed building of the Nanchang-Pingsiang Railway, which will connect with the short colliery line already running between Pingsiang and Chuchow (south of Changsha, in Hunan Province), which latter point will eventually be a junction with the trunk line from Hankow to Canton. The proposed line will also connect with the line now being built from Kiukiang to Nanchang.

The Assistant Director of the Nanchang-Kiukiang Railway has received a report from Investigating Commissioner Ho Ping-sun in regard to the proposed work on the line, and has forwarded the report to the Kiangsi Tutu, requesting him to appoint officers to carry out the proposal. We give below a translation of Mr. Ho's very full report.

The Report was divided under seven headings, viz., 1, Railway Location; 2, Waterways; 3, Possible river crossings; 4, Materials obtainable along the line; 5, Transportation of Materials; 6, Products; 7, Popular Feeling.

I. *Railway Location.*—There are two big public roads from Nanchang to Pingsiang: (*a*) Beginning from Nanchang to Tsensutsen, 180 *li*; crossing the river to Linkiang, 210 *li*; to Sinyuhsien, 330 *li*; to Feni, 400 *li*; to Ichen 480; *li*; to Pingsiang, 620 *li*. (*b*) From Shatsin to Kao-an, 120 *li*; to Shangkao, 241 *li*; to Wantsai, 321 *li*; to Pingsiang 556 *li*.

The conditions on these roads differ in some respects, and the work on the railway would therefore be different. The length of road (*a*) is 620 *li*; that of (*b*), 556 *li*.

A greater part of road (*a*) is along rivers, while a greater part of (*b*) passes the hills. The riverine region is low, and the soil is not firm. To put up bridges and to fill up low places would entail great cost and much labor, while route (*b*) passes hills which are not very high or rough, and a moderate amount of excavation work will make a suitable road. When compared with (*a*), which will necessitate the building of numerous bridges and culverts, it means that one half of the cost will be saved. Moreover, at Sinyuhsien and Feni, the (*a*) road passes Pao-shan (Pao mountains) and Chang-shan (Chang mountains) respectively, at which points, besides filling up or bridging over the streams, it would also be necessary to cut a passage in the hills, thus doubling the difficulty of the task when compared with (*b*).

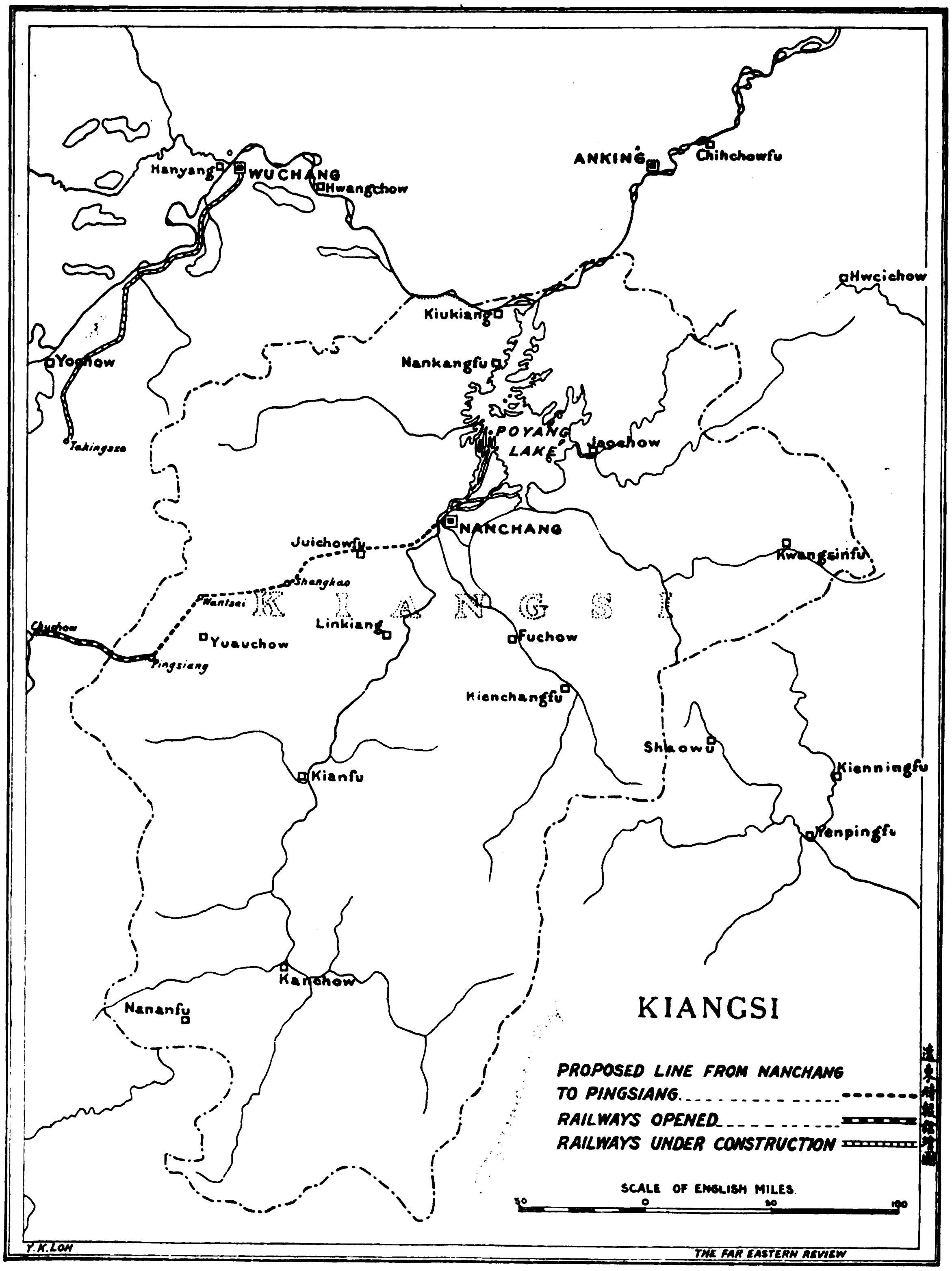
When we look at it from a business stand-point, it seems that road (*a*) has superiority in trade relations. But the real fact is that Linkiang is not so rich in products as is Juichowfu. If in the future it would seem necessary it would be easy to build a branch line to Kianfu, to the south, and then (*b*) line would be much superior to (*a*) in all considerations. There is a great variety and richness in mineral products along the two lines, and whilst the route can run fairly direct, there will not be either very high grades or very acute curves. When looked at from various views, we recommend the (*b*) line as most economical and suitable.

The following is a detailed description of the (*b*) line:

Proceeding from Nanchang southwest from Sha-tsing to Changterling, 10 *li*; thence to Longevity Palace at Si-Shan, still keeping to the southwest, 50 *li*; thence southwest-ward to Kaoyu-sz, 30 *li*, in which section there would be several curves; passing the Jui-Ho (river) to Ho-sha-kang, 40 *li* (this point is 18 *li* from Juichowfu and 70 *li* from Tsingkiang): thence to the southwest, to Yin-kang-ling (hill) 30 *li* (in which section three or four curves would be necessary); thence to Shui-peh-shu, 40 *li*; thence to Kiang-tung-shu, 30 *li*, at which point it is 25 *li* from Sinyhsien, and 70 *li* from Shangkao; thence to Chao-Mokung, 20 *li* (this section is along the foot of the hills and the line is straight; minerals are abundant in the vicinity, but the road is at a high elevation;) thence to Yang-Chiao, 35 *li* (in which section, two bridges must be built, one being 24 feet in length, the other 150 feet); thence toward the south-west, to Hu-Kiang, 20 *li*; thence to Zeh-ling-pu, 20 *li* (which is 60 *li* from Wan-tsai); thence to Huang-Hò, 40 *li*, (where a bridge 230 ft. long will have to be built); thence to Hsuang-fung-tsen, 20 *li* (at which point, the line crosses a stream 300 ft. in breadth); thence to Luchi, 25 *li* (where the line passes a stream 200 ft. in breadth); thence to Ka-kangpu, 20 *li*; thence to Pingsiang, 20 *li*; and thence to An-yuan, 15 *li*. In all the line will cover a distance of 485 *li*.

II. *Waterways.*—The biggest river that the Nan-Ping line must pass is the Siukiang, which has its source at the Yu-Wang-Shan (hills) near Pingsiang, flowing northeast and then east passing Yuanchow-ki and Tai-hungshan, and again southeast passing Feni and Sinyuhsien, and finally to Linkiangfu and Changshu, where it flows into the Kan-kiang.

The second biggest river is the Jui-ho, which rises west of Wan-tsai and passes Shang-kao and Juichowfu, and flows into the Kan-kiang.



III. *Crossing Points.*—At Kaoyu-sz. the point where the railway crosses, the river is 500 ft. wide, and 20 ft. deep; at Yangchiao, the river is 100 ft. wide and 10 ft. deep; at Wangsha, the river is 200 ft. wide and 10 ft. deep; at Hsuanfung-tsen, the river is 300 ft. wide and 20 ft. deep; at Lu-chi-sz, the river is 200 ft. wide and 4 ft. deep. These are the bigger rivers. Besides these, there are twelve streams, the maximum width of which does not exceed 100 ft., and it would be easy to erect bridges. The above measurements of the depths of the canals were made during the low-water season.

IV. *Material ready-at-hand.*—At I-chen, Sindien-chiao and other places, abundant materials like gravel, stones and sand can be obtained. Stone masons also can be had, and the work on the bridges may be carried out without difficulty. There is very little timber in the district where the line passes.

V. *Transportation of Materials.*—There is a post road from Nanchang to Pingsiang, and handcarts may be used to transport materials, but such carts can take a load of 70 catties, and not more. As to bridge materials, such as iron, timber, etc., these may be shipped by the water route, from Nanchang to Jui-Ho (river) or Yuan-ho, and then transported overland to the line.

VI. *Products along the Railway.*—The main products of Jui-chow and Kao-an are rice; of Sinchang, paper and flax cloth and high-grade flax; at Wantchai, flax cloth and fire-crackers: at Ichen, charcoal and coal, and copper. These products are turned out in great quantities and constitute very big trades. At present, these are mainly shipped by water; great difficulty is experienced in shipping overland, and when the railway is built, no doubt great development will take place.

VII. *Popular opinion regarding the Railway.*—The gentry class along the line are earnestly expecting the construction of the railway, and the people of Pingsiang are specially anxious to see the line completed as soon as possible. The reason is not far to seek. On account of the proximity of Pingsiang to Hunan, Hunan people are more able to enjoy the advantage of trade relations, and the business in the Pingsiang district is swayed to a great extent by merchants from Changsha. The people realise that if it is difficulty of access to the district that bars the Kiangsi people from enjoying the share they are entitled to of the benefits accruing from trade relations, and that if the railway is not built to bring the various cities into closer relationship, Pingsiang will soon be out of the range of the Kiangsi's people's influence. Pingsiang is well-known as a mining-district, and the mine-owners are most emphatic in their appeals for a railway. Only the ignorant coolie class entertain fear as to the loss of their work after the railway is completed, but this is a groundless fear and may be soon dispelled. So there is no obstacle at all for the carrying on of the construction work.

Supplementing the report, the Assistant-Director of the Nan-zin Railway (Nanchang-Kiukiang) requests that engineers and surveyors be sent to make detail surveys and make accurate maps so that there need not be a second survey, and the work on the line may be carried out as soon as the surveying is done. An appropriation of 300,000 Taels has been allowed. This sum is not enough for the construction work, but it is more than ample for the surveying.

It was suggested that a Railway Surveying Bureau be set up in Nanchang to undertake the surveying of the various lines which sooner or later must be built, such as the lines to Nanhsiung-fu, of Kwantung, to Yu-shan, of Chekiang, and to Nan-ting, of Fukien. No doubt such surveys will greatly expedite the carrying out of the actual construction work, which may be started as soon as a favorable decision is arrived at.

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended February 22 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913	48,656	9,974	58,630
1912	33,164	2,121	35,285
Increase	15,492	7,853	23,345
Decrease	—	—	—

For seven weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	366,771	63,380	430,151
1912	381,066	35,138	417,104
Increase.	—	28,242	13,047
Decrease	$15,195	—	—

Week ended March 1:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913	55,235	11,703	66,038
1912	43,993	4,614	48,607
Increase.	11,242	7,089	16,331
Decrease	—	—	—

For eight weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	422,006	75,083	497,089
1912	425,959	39,752	465,711
Increase	—	35,331	31,378
Decrease	3,953	—	—

Week ended March 8:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	49,627	10,614	60,241
1912....	44,182	4,489	48,671
Increase.	5,445	6,125	11,570
Decrease	—	—	—

For nine weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	471,633	85,697	557,330
1912....	470,141	44,241	514,383
Increase.	1,492	41,456	42,942
Decrease	—	—	—

The week ended March 15:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	52,337	11,962	64,290
1912....	51,373	5,146	56,517
Increase.	964	6,816	7,782
Decrease	—	—	—

For ten weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	523,970	97,659	621,629
1912....	521,514	49,385	570,899
Increase.	2,456	48,274	50,730
Decrease	—	—	—

The Lo-tung Line and Nationalisation

Mr. Kin Chi-ji, a shareholder of the Lo-tung Railway, recently sent the following telegram to the Government:—"The Haichow-Lanchow Railway is a great and important trunk line, traversing a distance of 4,000 *li* and it will be urgently needed for both military and commercial purposes. The Lo-tung Railway is one of its middle sections, and since the trunk line is to be owned by the nation, we request that the Lo-tung Railway be also put under Government control. This step is most urgent in view of the fact that all funds of the line have now been spent, and since the Revolution the market has been in so strained a condition as to be unable to supply the line with money, and the only means by which to carry on the work is to float loans. Whether the loan is to be floated by the Government or the merchants, the process is identical, but the result would be widely different. During the recent few years, most of the shares have been purchased with the proceeds of an additional salt tax, and shares that were bought by other people form but one-third of the whole. The Lo-tung Railway Company have now tried to effect a loan clandestinely with a company in Tientsin, giving the whole section as security for £500,000. When the Government ordered the Company to cancel the loan, the Company tried to evade the order, on the pretext that they will ascertain the wish of the shareholders. According to the Company's regulations, there is one vote to every hundred shares, and all small shareholders may combine and obtain a vote. Most of the shares were distributed by the Magistrate and the receipts or share certificates were deposited with the Company, so that when a shareholders' meeting is called, it happens that one man may have several hundred votes, and of course everything can be managed in any way he likes. In their attempt to disregard the Government's order the so-called shareholders' meeting will be organised in this way. We earnestly request the Government to send a Commissioner here to take over this Company." The above telegram was signed by 157 men aggregating 25,000 shares.

MESSRS. J. DAMPNEY & CO.

Messrs. J. Dampney & Co. of Cardiff and elsewhere have sent us copies of their 8th Edition Booklets dealing with their "Apexior" Compound, "Miraculum" Graphite Paint, and "Asphaltene."

"*Apexior*" *Compound.*—The list of important users at the back of the booklet is of great interest. We observe that the majority have placed repeat orders. It appears that "Apexior" will absolutely stop corrosive pittings in steam boilers, whilst scale is rendered nonadherent owing to the peculiar nature of the surfaces presented by "Apexior" and is removed by lightly tapping with a flat faced hammer or a wire brush.

"*Miraculum*" *Graphite Paint.*—This is a highly efficient coating for all kinds of Iron and steel work where decorative effect is needed. It has proved particularly useful for corrugated iron as it will withstand climatic influences.

"*Asphaltene.*"—A highly efficient covering for all kinds of iron and steel work subject to unusually trying conditions, that is, submerged or underground, exposed to acid or alkaline fumes or liquors which it is claimed Asphaltene will absolutely resist. It is also a cheap and efficient covering for any kind of work where the color black is suitable.

Booklets relating to the above are at the disposal of persons or firms who may be interested.

CANTON-KOWLOON RAILWAY

The Terminal Station Building at Kowloon Point

A terminal station building and a passenger station yard are to be constructed at Kowloon Point, the terminus of the railway from Canton to Kowloon, by the Hongkong Government. We take the following particulars from a Hongkong paper:—

The station yard will extend over an area of some 11½ acres from Holt's Godowns at Blackheads Point to the present Kowloon Ferry Pier, on the south side of Salisbury Road. Provision is to be made for a double line of way from Hung Hom, spreading out to

7 or 8 lines of way on entering the station yard. Only 2 or 3 lines of way will be laid in the first instance, further lines being laid as requirements necessitate.

A new ferry pier is to be constructed half way round the curve in the sea wall at Kowloon Point capable of accommodating two ferry boats at a time, and when completed, will release the present ferry pier for Police and Public purposes.

There will be a large open area between the Praya Wall and the station building, as it is fully recognised that Kowloon is as yet in its infancy and that tramways, motor cars and other wheeled vehicles must have ample space provided for their accommodation.

The station building itself, which will be of brick and granite, is to be a monument worthy of the Colony; it will stand out alone in the foreground of Kowloon as seen from the Harbor and Hongkong and will present a bold and imposing appearance. Of two stories high the massive coping will be supported on a series of tall columns about 30 feet high, on the sides facing west and south; while the Clock Tower, 130 feet high, situated at the south west corner, will undoubtedly enhance the appearance of the building, and manifestly distinguish it as the principal and most important structure in Kowloon.

The portico, in the form of an advanced collonade, will be some 60 feet by 14 feet and allow passengers to enter the building in wet weather from their vehicles, under shelter, while a further covered way will reach from the Clock Tower to the Ferry Piers.

On entering the building by a flight of some four or five steps one is immediately confronted with the Customs office and Barriers, first and second class passengers moving one way, third class the other, through wicket gates into the vast covered concourse some 150 feet by 80 feet in the centre of which are the booking offices, and beyond more wickets are the various platforms, of which there will eventually be three, all capable of receiving a train on each if necessary.

On the ground floor accommodation is provided for Station Masters Office, Telegraph and Parcels Office, First and Second Class Waiting Rooms, (General, and for Ladies), First and Second Class Refreshment Room, Third Class Waiting Rooms, and Third Class Refreshment Room, Customs Officers' Room and Strong Room, Rooms for Police, Porters, Guards, etc., Railway Post Office and the Traffic Superintendent and the Traffic Clerks Office.

By a stair-way under the Tower the second storey is reached on which will be accommodated the various offices of the Railways Administration.

It is intended to provide an electric clock in the Tower with large faces, and regulated automatically every hour by electricity. From the flag staff on the top will be shown the Night Harbor Police-Signals, as the Tower will hide the present Police Signal Staff from some parts of the Harbor.

The building will be capable of extension on the south side in the direction of Blackheads Point.

The scheme has been submitted to Members of the Executive and Legislative Councils and they have unanimously approved it.

Chinese Eastern Railway

The railway has a total mileage of 1,081. Below we give figures showing the comparative returns for 1911 and 1912:—

			Yearly returns	
	1911	1912	1911	1912
			Rbls.	Rbls.
Passenger traffic (passengers with free passes not included) - - - - - - -	1.208.953	1.660.533	3.451.608,96	4.241.713,69
Luggage - - - - - - - - -	Pouds. 243.057	Pouds 285.032	117.178,23	106.851,02
Goods transported by fast and passenger train	Pouds. 667.855	Pouds. 1.225.449	279.841,55	441.097,03
Goods transported by slow trains - - -	Pouds. 88.045.651	Pouds. 75.108.242	12.596.225,26	12.092.963,01
Supplementary revenue and sundries - -	—	—	3.132.575,51	2.170.202,65
Total - - - - - - - - -	—	—	19.577.429,51	19.052.737,40
Expenditure - - - - - - -	—	—	16.460.082,18	
Net profit - - - - - - - - -	—	—	3.117.347,33	

Kirin-Changchun Railway

The Kirin-Changchun Railway was completed on October 20th, 1912. Since that date the traffic service has been started and generally has proved satisfactory. But the Railway authorities felt that they are not giving the maximum efficiency and that there are defects in the equipment of the line. It has been decided that the following works on the line be carried out within this year:—

The mountain at Tumenlin is very high and rugged and the engineers have two schemes: one to make a tunnel, and the other to make a cutting. As it will require a long time to cut the tunnel, it has been decided that for the time being the line will follow the present longer route, and as soon as the weather gets warmer, the work on the tunnel will be started. The original estimate of the cost for the cutting of this tunnel was $180,000, but it is now placed at $200,000.

The Kirin-Changchun line is 80 miles in length, and only three stations have been built. There are small stations on the line, but these are of a temporary nature and not adequate for the handling of merchandise. It is proposed to rebuilt these stations. The funds required were estimated at $10,000. The necessary materials have already been procured, and the work will be started in May.

The workshop now in use is not equal to the demand, and it is proposed to put up a new workshop at Changchun. Two engine sheds are also to be built. This will also be carried out within this year.

Out of the monthly income of $70,000 of the Kirin-Changchun Railway a sum of $50,000 is appropriated for the running expenses and the remaining $20,000 to pay for the materials already bought, and other incidentals. There is no surplus, and the Company is approaching the Department of Communications for money to carry on the needed work on the line. If the Department does not give any help, the work will have to be put off till next year. If the Department gives sufficient funds, the railway might be extended to the bank of the Sung-Hwa-Kiang, where a wharf will be built.

Mr. Yu Yu, the new Director of the Kirin-Changchun Railway, arrived at his post on March 3. Mr. Sun, the outgoing Director, intended to leave Changchun for his home in the South the following week.

Kwangsi Railways.—The Kwangsi Tutu had wired the Government to the effect that the French demand a share in the building of Kwangsi Railways, and that no argument he could use could induce them to abandon their desire. He asks that the Foreign Office be instructed to deal direct with the French Minister.

MANCHURIA

South Manchuria Railway

The South Manchuria Railway Co. has secured the sanction of the Finance Office, Tokyo, for the proposed investment of about Y.14,100,000 as capital expenditure for the fiscal year 1913. Among the principal items are included the following:—

Foundation work for New Quay to the west of Main Quay. Dairen. (The first annual instalment).	about Y.200,000
Experimental Bean Mill (attached to Central Laboratory). Y.200,000 for machinery and installation, and the balance for building expense.	about Y.240,000
Construction of two coasting cargo steamers for charter to the Dairen Steamship Co.	about Y. 60,000
First annual instalment for construction of new premises of Central Railway Hospital. Dairen. Foundation work and Isolation Ward.	about Y. 80,000
Sand-flushing equipments for Fushun Colliery.	about Y.650.000
Extension of Central Laboratory.	about Y.200,000
Construction of a round-house and 2nd class sleeping cars.	about Y.200,000
For establishment of Agricultural Experimental Station at Kungchuling.	an indeterminate sum of money.
Equipments and improvements of Y mate Hotels at Dairen and Mukden.	,, ,,
Re-construction of various station buildings.	,, ,,
Harbour works at Dairen, Antung, and Yingkou.	,, ,,

The company may call up the balance of the subscribed share capital amounting to Y8,000,000. The Company must make up somehow the deficit of a little over Y.6,000,000 in order to defray the required capital expenditure. It proposes to set aside under the head of special reserve Y.2,000,000 from the profits of the current fiscal year. The sum and substance of the question confronting the Company is how to raise the remaining Y.4,000,000. It is most likely that recourse will be taken to an increase of the Company's share capital, and additional shares will be offered for subscription.

The S.M.R. Traffic Returns for the month of February totalled Y.1,783,390, being an increase by Y.208,919 over the corresponding month of last year. The daily average for the month was Y.63.692.

Hulan-Suihua Line.—The *Manchuria Daily News* reports that the Foreign Intercourse Office at Harbin has telegraphed to Gov. Chen, at Kirin, in the following sense:—"Lieut.-Gen. Horwath, Director of the Chinese Eastern Railway, Harbin, has proposed that the long pending question of laying a light rail line between Hulan and Suihua 75 miles distant from each other, requires an early settlement. As the nature of this question does not admit of its being shelved altogether, so says the General. he intends to send out a party of about twenty surveyors and engineers along the proposed route, leaving open the question whether the Russian or the Chinese authorities shall undertake the construction of the light rail line." This telegram has added that the Russian proposal has been refused. Much curiosity is evinced as to how the Russian authorities will take this rebuff. The uninterrupted expanse stretching between Hulan and Suihua (known also as North Tuanlintzu) is conceded to be the most fertile plain in Manchuria, and half the wheat put on the Harbin market is supplied from this rich granary. Russian merchants and their agents travel in this part of country constantly during the produce season, and it is about this same district that the Russians wanted to deal with the bandits operating boldly therein by means of their own troops.

Mukden-Jehol Railway.—The Mukden Tutu, Chang, agrees with the proposal of General Hsiung Hsi-ling, to build the Mukden-Jehol Railway. He has assisted him to carry forward this project and has joined him in sending a telegram to the Government urging an appropriation and early start on the work.

JAPAN

State Railways of Japan.—The net receipts of the Japanese State railway lines for the current fiscal year are given at about 17,000,000 yen up to the end of February, an increase of about 2,000,000 yen over the estimate of 15,000,000 yen. Estimating the net receipts for March at some 1,200,000 yen the total receipts for the present fiscal year will be more than 18,000,000 yen.

Traffic on Japanese Lines.—Goods traffic on the Japanese railways, which was very active during October, November and December—more so than in the corresponding period of any proceeding year—was greatly depressed in January, the falling off amounting to 15 per cent. from the figures for January last year, and this depression continued last month. This diminished traffic is attributed to bad sales of New Year goods in the interior for the old-style New Year. The daily average dispatch of goods from Umeda Station, Osaka, has been not more than 250 car-loads lately, a decrease of between 80 to 100 cars from the figures during the busy time above referred to. Such a depression in goods traffic from Osaka has not been seen for many years. Recently the regular fertiliser season opened, and summery goods are also beginning to come out; as man as 320 cars are frequently required daily for goods sent from Umeda. The carriage of summer goods is expected further to increase, and the opening of the Toyama-Naoyetsu Railway on April 15th will increase the goods traffic to Nigata prefecture.
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Russo-Japanese Traffic Agreement.—According to Mr. Yoshikawa, Vice-Councillor of the Japanese Railway Board, who with Councillor Hoki attended the Russo-Japanese Railway conference at St. Petersburg, a most successful outcome is anticipated. About the end of March the Vice-President of the Eastern Chinese Railway, its adviser, the head of the Commerical Section, and others, numbering probably five in all, were expected to arrive in Japan to hold a conference in Tokyo with the Japanese authorities. The active operation of the new service will be begun about August next, and preparations have so far progressed that the list of through freight charges has already been drawn up by Japan, and the Russian authorities are ready to apply for the sanction of the Minister of Communications to their scale. The stations between which this new freight arrangement was to exist were first estimated at fifteen, but, as a result of the conference, the stations were fixed as follows:—Russia:—Vladivostok, Nikolaievsk, Harbin, Khaborovsk, Imenpo, Ajibe, Tsitsihar, Manchuria, and Hailor. Japan:—Shimbashi, Yokohama, Nagoya, Kioto, Osaka, Kobe, Tsuruga, Shimonoseki, and Moji. As the immediate result of the opening of this service, 2,000 tons of cotton and about 1,000 tons of miscellaneous goods will be sent to Harbin and neighbourhood, and in future about half the goods now being sent to Vladivostok via Tsuruga will be sent through Tairen.

MONGOLIA

Kalgan-Urga Line.—According to the estimate of engineers despatched by the Ministry of Communications, it is reported that an amount of about two millions and a half is enough for the construction of the important Kalgan-Urga Railway. The Ministry has brought up the question before the Cabinet Council and it is strongly supported by the Premier.

KOREA

Light Railway in North Chosen.—According to a report received by the Seoul Press from Songjin in North Hamkyongdo the Collbran-Bostwick Development Company had planned to construct a light railway between their mines at Kapsan and Songjin via Kilju, and carri d out a land survey for that purpose a few years ago. The district between the two places, however, being mountainous and communication difficult the Company deemed it better to execute the plan after the completion of a highway between Songjin and Heisanchin, which was started at the end of 1911. Now that the construction of the highway is nearing completion, the report says, the same company has decided to execute the long cherished scheme of laying a light railway between Kapsan and Songjin, 70 miles in length, and is going to send in an application for permission to the authorities concerned. The chief object of the Company in laying the line is to transport ore from the mine to the harbour of Songjin, and it is not yet decided whether the line will be available for general traffic.

MALAYA

Federated Malay States Lines.—The *Malay Mail* of January 31 says:—We believe the idea of double-tracking the line between Kuala Lumpur and Port Swettenham has been kept in view for some time past and the question naturally arises whether it would not be advisable to electrify this section of the line. Then instead of working the traffic with long, cumbersome goods trains at rare intervals, short trains of four or five trucks could be despatched every half hour. It would take less time to load and unload these short trains and consequently the working capacity of the rolling stock would be much increased.

The Kedah Railway

An excellent example of the method of railway making in Malaya is afforded by a visit to Mertajam, from whence the new line to Alor Star is being constructed. Mr. H J. Highfield is the engineer in charge of the section.

The work now extends to the fortieth mile. Another engineer is expected shortly at Alor Star to commence the earth works at that end. In the district of Bukit Mertajam the work is rapidly assuming the appearance of a railway line. For several miles the cutting and levelling has been effected, and good progress is being made with bridges and crossings. Several hundred yards of rails have already been laid, but this early start was in order to facilitate the removal of material from the railway station to the workshops. The soil is in every way suitable for working, and it has been necessary to do but very little blasting. The whole work in fact has suffered few hindrances. Heavy rains hampered the work somewhat, but considering the comparatively short time operations have been in progress really remarkable work has been effected. Although work at the rail-head section commenced nomi ally last April it was limited to a portion of an estate near the station, and it was not until November 4th that a connected link through the Province was established and the work proper begun. In all there are thirteen bridges on the first seven miles of the line, and all of them are now nearing completion. In jungle work it is customary to leave the bridges until the last, but in the present instance the carting and general facilities have been exceptionally favourable. From Bukit Mertajam to the Muda River, indeed, the course lies mostly through *Kampongs*. The bridge over the Muda River will be 850 feet in length, and will be the largest in the F. M. S. A telegraph is at work. The works have their own mail system, relays of runners taking communications from Bukit Mertajam through the forty miles covering the six sections. In the workshops Chinese tukangs are employed making practically every article of furniture that will be required for equipping the new railway. Indeed, everything except the actual railway metals appears to be made here—desks, seats, ticket compartments, ladders, tables, etc.: whilst Bengali blacksmiths fashion the iron and steel fittings, railings and various other material required for the level crossings, etc. Several score of men are employed in the workshop but the total employed at the rail head section averages a thousand. Bukit Mertajam Station is to be completely remodelled, and there is every likelihood of the township itself becoming a highly important centre in the near future. A double platform, with an overhead bridge, is to be built and the track will be duplicated to Prai. A signal cabin is to be constructed, and plans have also been prepared for new permanent quarters for officials on the Hill and additional coolie lines. The huge swamp, covering some four acres, immediately to the right on leaving the station, Mr. Highfield has had filled up, and a goods yard, with a road leading to it, is to be constructed. Although there has been comparatively little sickness among the men employed on the work the precaution has been taken to secure special hospital accommodation. A temporary ward has been built and furnished in the Hospital grounds and placed under the control of the Assistant Surgeon.

WIRELESS IN THE PHILIPPINES

One month from the date of completion, the wireless station of the bureau of posts erected at San Jose, Mindoro, got into communication with the Zamboanga wireless. The distance covered by this wireless is over 360 miles. The San Jose wireless station is not used for wireless communication with Zamboanga, as there is communication with the Cuyo wireless station, which is only 160 miles from Zamboanga station, but is used for communication to and from Mindoro. The plant is a 3½ K. W. and is the seventh wireless station to be erected by the bureau. The other stations are at Zamboanga, Jolo, Malabang, Cuyo, Puerto Princesa, and Davao. It is understood that the next plant erected will be a very large one for Manila.

THE PHILIPPINES

The Manila Railway

Applications have been invited at 95 per cent. for £750,000 five per cent. debenture stock of the Manila Railway Company (1906), Limited, the proceeds of which are to be devoted to further construction or to the discharge of obligations incurred for construction already carried out. The company is a constructing and holding company, and owns the whole of the first, and second mortgage bonds and share capital of the Manila Railroad Company, which (incorporated in 1906 under, the laws of the State of New Jersey, U. S. A.) owns and operates, with the exception of suburban electric lines, the entire railroad system of the Island of Luzon, which is the chief of the Philippine group. The lines of railroad authorised by this company's concessions are being constructed by the Manila Railway Company (1906), Limited, and will form an undertaking of 820 miles, divided into two systems—one designated the "Northern Lines," which will, when completed, comprise approximately 350 miles to the north of the city of Manila, the other designated the "Southern Lines," which will, when completed, comprise approximately 470 miles, all but about 20 miles, to the south of Manila, and a port line in Manila. There were in operation in 1910 286 miles of the Northern Lines and 83 miles of the Southern Lines, in 1911 this mileage had been increased to 295 and 130, and in 1912 to 305 and 161, respectively. The amount required for payment of interest is ensured by a guarantee of the Government of the Philippine Islands in virtue of an Act of Congress of the United States of America.

The steamer Kioto which arrived at Manila on February 27 from New York brought ten new locomotives for the Manila Railroad Company and three thousand steel rails. The engines were all taken apart at the American Locomotive Works and packed for shipment and the boilers were loaded separately.

Baguio-Aringay Line

Work on the Baguio-Aringay railroad extension, reports the Manila *Daily Bulletin*, is progressing rapidly, grading being done at both ends and along the line of survey. The entire line from Aringay, where the road will connect with the main line north, will be thirty-six kilometers long and traverse some of the most beautiful and scenic country in the Philippine Islands.

Beginning at Baguio almost seven kilometers of the grading has been completed. The road bed is in excellent shape and all that remains on the Baguio terminus is the filling in of a couple of small spaces over culverts and the building of two small bridges. Starting from the foot of the hill below Mount Mirador the railway line descends to the valley at the rate of twelve feet to the hundred, but before more than three or four kilometers are covered it emerges from the slopes and opens before the traveller one of the grandest panoramic views imaginable. On a clear day, the traveller can see for many miles, as far north as San Fernando, Union. The vista includes lowland country between the mountains and the China Sea and for miles out across the sea where with a pair of binoculars vessels of all classes may be seen, many, many miles out.

The scenery along the railroad line is also beautiful. There are gorges and cañons, cuts through the mountain tops several hundred feet deep, with but little water to contend with and but few bridges to erect along the line.

The formation of the country from Mirador to the plains is such that but little trouble will be experienced even in the rainy season, as the water disappears in hundreds of what might be called natural sinks, and does not emerge again until it reaches the lowlands. At the present time there is not even water enough along the line of the road where the grading is being done to aid in the work or to supply the force of men, it being necessary for the company to pipe water for use for the various camps along the line of work. There are over 1,000 men, with few exceptions all Igorots, on the Baguio end of the line and they make good laborers, working steadily and with a will throughout the day without the necessity of being driven. At places the mountains are being blasted away, leaving cliffs several hundred feet high, but these are mostly rock and will never be dangerous or make trouble for the company once the roadway is completed. Long stretches of the roadbed are completed and ready for the ties and rails and the roadbed itself is a good solid foundation. most of the distance being of a rock bed, the only exceptions being the few fills. At one or two places dirt hills were cut through, but the slopes are to be well graded and the sides sodded in order to avoid slides during the rainy season.

Farther down the line great cuts are being made by sluicing, the water being piped for several miles for the purpose. The sluice cutting is proving a success and is making great headway. Great mountains of rock, mostly sand rock, are being cut away by the water used, the stream applied having a pressure of seventy-six pounds to the square inch. This process might be applied at the Baguio end of the construction, but no water is available for the purpose and the Igorots are depended upon to do the excavation work with pick, shovel and dynamite blast, under the supervision of American and English foremen.

The general average of the grade of the road is twelve feet to the hundred, except at points where a curve is to be made and here the grade is released somewhat, but made up for at other points where there is a straight stretch of the line for some distance. It looks rather steep, but the engineers state that this grade will not be an over steep one and may be safely navigated. As to washouts it is safe to say they will be few and far between. At most places along the line for the majority of the distance the road bed is on solid material and for much of the distance on solid rock. Only an earthquake or a cloudburst can damage the roadway or sweep it away. The average wage paid the laborers on the grade is about forty-five centavos and board and the Igorots are taking advantage of the opportunity to make a few extra pesos while the work lasts.

On the lower extension of the roadway there will be three tunnels, averaging about six hundred feet in length each, that it was deemed advisable to construct rather than cut the hill away.

The work on the entire line is being pushed forward and the engineers and foremen in charge deserve great credit for the headway that is being made. It will not be many mo ths until the traveller leaving Manila will have the privilege of a through car to the Baguio station without the necessity of transferring bag and baggage at an extra expense and inconvenience.

SIAM

Meklong Railway Co.—The following is the Report of the Board of Directors of the Meklong Railway Co., Ltd., for the year ended 31st December, 1912 (omitting cents):—The Working Account for that period shows a gross income of Tcs. 292,557 and expenditure amounting to Tcs. 107,957. The Profit and Loss Account, after deduction of Debenture Interest, Concession, Redemption and Depreciation, shows a net profit of Tcs. 118,574. To this has to be added Tcs. 13,160 carried forward from the previous year, making the total amount available: Tcs. 131,734.

The Directors proposed to deal with this amount as follows:—

Dividend of 5%:	Tcs.	111,500—
Directors' fees:	„	8,000.—
Manager's bonus.	„	2,787
Statutory Reserve;	„	5,389
Carry forward to next year:	„	4,057
	Tcs.	131,434

Bangkok-Petchaburi Section.—It is understood that from April 1, the Southern Railway will take over the working of the Bangkok-Petchaburi section which is now managed by the central office. The arrangement has been brought about in order to facilitate traffic on the Southern Line. It is hoped that the long interval which at present occurs at Petchaburi before trains proceed down south will be greatly shortened by the new arrangement.

Paknam Railway Co., Ltd.—The forty-third ordinary general meeting was held at the offices of the Company at Bangkok on Feb. 14, when the Directors' report for 1912, balance sheet, etcetera were were submitted to the shareholders.

The Chairman said that he could assure them that things were satisfactory. In 1911 there was paid a dividend of 14 per cent.; in the year under review they pay a dividend of 13½ per cent. During the first six months of 1911 their income was much larger, but the last six months of 1912 gave a slightly better return than in the corresponding period of 1911. The Chairman made known that five kilometres of rails would be landed in Bangkok in a few months. The expense of the material would be met from depreciation funds without shareholders being called upon. This was the second time that rails has been renovated. During the year, he continued, their system had been changed giving up motor traction for electricity. The result was satisfactory, receipts more than doubling, while running expenses only slightly increased.

Burma-China Railway.—The Liverpool Chamber of Commerce is interesting itself in the proposed railway from Rangoon to China and has been in communication with the Foreign Office and the Rangoon Chamber. Many years ago Mr. Holt Hallett and Mr. A. R. Colquhoun addressed the Manchester Chamber on the subject, and it is believed that details of a scheme have been worked out, and are filed, awaiting a favourable time for execution. The assistance of the Manchester Chamber of Commerce has been requested by Liverpool. The India Committee regard the matter as of considerable importance, and recommended that a conference with the Liverpool Chamber should take place after that Chamber had been supplied with the further information it was seeking. The board approved these arrangement.

SHANGHAI TRAMWAYS

The returns of the Shanghai Tramways (Foreign Settlement) for two months ended February 28 are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 132,626.06	$ 122,026.06
Passengers carried	6,492,886	6,043,001
Car miles run	427,729	444,960

The loss by exchange of subsidiary coinage for the period was $33,824.82 equal to 21.67 per cent of the gross cash collected on the cars as compared with $36,402.01 equal to 24.60 per cent. for the corresponding period last year.

The returns of the Shanghai Tramways (Foreign Settlement) for the week ended February 26, are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 15,244.40	$ 14,699.14
Passengers carried	761,365	730,295
Car miles run	49,395	51,535

The loss by exchange of subsidiary coinage for the week was equal to 22.98 per cent. of the gross cash collected on the cars as compared with 24.90 per cent. for the corresponding week last year.

Week ended March 5, 1913:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 16,211.91	$ 12,626.18
Passengers carried	816,996	629,717
Car miles run	52,370	47,781

The loss by exchange of subsidiary coinage for the week was equal to 23.22 per cent. of the gross cash collected on the cars as compared with 25.02 per cent. for the corresponding week last year.

Week ended March 12, 1913 are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 15,529.89	$ 14,706.39
Passengers carried	786,533	740,790
Car miles run	49,851	51,489

The loss by exchange of subsidiary coinage for the week was equal to 23.55 per cent. of the gross cash collected on the cars as compared with 25.03 per cent. for the corresponding week last year.

For the week ended March 19, 1913:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 14,957.16	$ 14,156.19
Passengers carried	757,602	712,766
Car miles run	48,700	51,332

The loss by exchange of subsidiary coinage for the week was equal to 23.49 per cent. of the gross cash collected on the cars as compared with 24.93 per cent. for the corresponding week last year.

New cars which are being built for the Company have entrances in the middle of the car, eliminating the present cramped entrances and exits at the ends, and giving the motorman an enclosed platform of his own where he can operate the car without being subjected to the pushing and crowding passengers. These trams have been under construction for some time, the new style of body requiring also a new class of truck. Considerable experimenting has been done in developing the latter, and it is expected that a trial of the result can be made in the near future.

Peking Tramway Co.—It has been reported from time to time that foreign loan agreements had been arranged for the construction of the Peking tramways, but these reports appear to have been unfounded. On March 2 a meeting of the promoters and others interested in the flotation of the Peking Tramway Company, a purely Chinese concern, was held at the Chinese Chamber of Commerce, Shanghai, under the presidency of Mr. Chou Chin-cheng. About 500 persons attended the meeting. It was pointed out that this company was assured of success in such a populous and prosperous city as Peking. Appeals were made to the patriotism of those present to induce them to support the company in order to prove to the foreigner that the Chinese themselves could successfully operate a large concern such as this. It is pointed out that the Government could not take over the tramways for 20 years and then only by buying out the company. A good many shares were subscribed for at the meeting and an active canvass is being carried on for the sale of shares by the Chekiang Bank, the Ningpo Commerical Bank and the Commercial Bank of China.

Yokohama Tramway Co.—A new line of the Yokohama Tramway Co. was opened to traffic on the 20th Feb. traversing the districts west of the city which were incorporated in the Municipality a few years ago. Starting from Nihonbashi, the terminus of the old line, and leading to Oyster Mary's, the new line runs as far as Tobe, close to the Ishizaki railway-crossing, near Hiranuma Station. The Honmoku line is laid through a tunnel pierced under the Bluff, and the Tobe line is laid over the hills of Kuboyama, on the top of which is a station commanding a fine view of the city. From Kuboyama the line runs towards Tobe. The *Japan Gazette* states that the distance between Nihonbashi and Tobe is two miles and ten chains, and the journey, through wooded country, can be accomplished in seventeen minutes. The work of constructing this line was started in September last, the estimated expenditure being Y.600,000.

Nantao Tramway Co.—The work of laying the tramway from the Shanghai-Hangchow Railway Station to the Tungkadoo Wharf in single track, with three shunting sections, and from Tungkadoo Wharf to the 16th Ward Bridge in double tracks, has now been begun in earnest by the Nantao Tramcar Company. If nothing untoward happens in the meantime, the above tracks will all be laid by May 9 next.

Manila Electric Railroad.—A Manila paper reports that work on double-tracking the initial section of the Marcelino-Santa Ana line of the Manila Electric Railroad and Light Company is now in progress on the section between the car barn and the switch southeast of that point. Work will also commence at an early date at the McKinley junction with the Santa Ana line and continue westward towards the bridge on Herran at Paco. It is the purpose to ultimately double-track the line from the junction with the McKinley line to the car barn west along Herran, northwest along Nozaleda and then over San Marcelino to the car barn. The work will be c rried out in sections where the present width of the street allows and, as the streets are widened to comply with the plans of the city, the loose ends will be connected with double tracks. Even with the sectional double-tracking great relief will be accorded the congestion and a better service in maintaining the schedule to and from Santa Ana will be maintained. The total distance to be double tracked is about one and one-half miles. From Estero Balete just south of the car barn to the Paco fire station, the first section to be completed, measured about one-third of a mile.

The Hanshin Electric Tramway Co.—The traffic receipts of the above company for February showed an increase of Y.5,000 on the figures for the corresponding month of last year, while the electric lights supplied by the company have increased to 30,000. The company commenced the work of constructing its branch line in North Osaka on the 6th February and is now pushing on the work in order to open traffic on the new line by the end of the year. A charter is now awaited for the construction of a branch line from Amagasaki to Takarazuda, and the work of construction will be begun immediately the charter is granted. The unpaid capital—amounting to Y.1,600,000—is to be called up for the funds required for the construction of the new lines, but as more money will be required, the company is considering a scheme to increase its capital. It is estimated that when the capital is increased, the present rate of dividend of 12% per annum will be reduced to 10%.

SHANGHAI ELECTRICITY CABLE CONTRACT

Messrs. Preece, Cardew & Snell have sent the Shanghai Municipal Council the following letter:—We have the honour to inform you that we have accepted Messrs. Siemens Brothers and Company's tender for the various high-tension and low tension cables. The official prices given in the tender amount to £21,098, but owing to various adjustments in the prices, due to a fall in the cost of electrolytic copper, the actual cost will be somewhat less.

The tenders received were as follows:—

Name	Price £	Delivery weeks
Siemens Schuckerwerke	20,877	15
Siemens Brothers & Co., Ltd.	21,098	16
W. T. Henley's Telegraph Works	21,372	12
British Insulated and Helsby Co.	22,468	13
R. R. Todd (Felten and Guilleaume)	22,693	9
Callender Cable and Construction Co., Ltd.	23,523	14
Allgemeine Elektricitats Gesellschaft	23,680	7 to 8
Johnson and Phillips	24,267	16 to 21 months
Banque d'Outremer	24,921	4 weeks
Pirelli & Co.	25,004	18
W. T. Glover & Co., Ld.	25,304	15
Western Electric Co., Ld.	25,313	20
Union Cable Co., Ld.	26,397	26
Electric Engineering and Equipment Company	26,952	13

It will be observed that Messrs. Siemens-Schuckertwerke were slighly lower in the aggregate than Messrs. Siemens Brothers and Co., Ld., Messrs. Henleys are also very close in price. The analysis of the different items included in these three tenders are as follows:—

	£	s.	d.
High-tension cable:—			
Siemens Schuckertwerke	12,087	0	0
Siemens Brothers and Co., Ld.	11,685	5	0
W. T. Henley's Telegraph Work	11,924	0	0
Low-tension cable 3-core:—			
Siemens Schuckertwerke	2,757	0	0
Siemens Brothers and Co., Ld.	3,106	0	0
W. T. Henley's Telegraph Works	3,173	5	7
Low-tension cable 4-core:— (alternative)			
Siemens Schuckertwerke	3,643	4	0
Siemens Brothers and Co., Ld.	3,434	0	0
W. T. Henley's Telegraph Works	3,606	5	0
4-core pilot cable:—			
Siemens Schuckertwerke	4,155	0	0
Siemens Brothers and Co., Ld.	4,430	0	0
W. T. Henley's Telegraph Works	4,488	13	1
Boxes, cable suspenders and men:—			
Siemens Schuckertwerke	1,628	0	0
Siemens Brothers and Co., Ld.	1,626	15	0
W. T. Henley's Telegraph Works	1,536	11	0

The basis price of Messrs. Siemens Schuckertwerke for copper was £79 per ton, while Messrs. Siemens Brothers' was £77.15.0 and Messrs. Henley's was £75.

It will be observed that Messrs. Siemens Brothers are lower in price for the high-tension cables, and also lower in the alternative price for the low-tension cables.

In view of the fact that the previous high-tension cables have been supplied by Messrs. Siemens Brothers and give every satisfaction, we felt we were in every way justified in placing the order with Messrs. Siemens Brothers. We accordingly sent for their representative, and told him that providing they would accept the order with copper at yesterday's (Jan. 30) London prices, namely £75, we would accept their tender. They agreed to this adjustment, which will effect a saving of about £250 in the total cost of the cables, and we are preparing the Contract with them forthwith.

The type of cable and the design of the joint boxes, etc., will be precisely similar to the materials which have already been supplied to the Council, and the work can be proceeded with without delay.

We have arranged with Messrs. Siemens Brothers that they are to make the first shipment of cable by March 14. The whole of the work is to be completed in 16 weeks.

American Blower Company's Sales Convention

The branch office managers and selling engineers of the American Blower Company met for their annual convention at the Hotel Pontchartrain, Detroit, U.S.A., on January 23rd, 24th and 25th. Enthusiasm with regard to the business of the past year as well as prospects for the future was evident throughout all of the sessions. Questions relating to Engineering, Salesmanship, Administration, Works-management and production were discussed at considerable length.

PERSONAL

Sir John Jordan, H.B.M. Minister at Peking, is taking four months' leave during the coming summer. He will probably depart from Peking on or about June 6. During his absence Mr. Beilby F. Alston, of H.B.M.'s Foreign Office, will officiate as British Chargé D'Affaires. Mr. Alston is expected to arrive in Peking in May.

The Chinese Minister to Paris, Mr. Hu Wei-teh, left Shanghai for his post on February 21 on the Messageries Maritimes steamer Ville de la Ciotat.

The Ministry of Communications has appointed Hwang Kai-wen Chief of the Railway office of the Southern section of the Kin-han Railway.

His Excellency Count J. de Limburg Stirum, Envoy Extraordinary and Minister Plenipotentiary for the Netherlands, who will take the place of his Excellency Jhr. Beelaerts de Blokland during his absence on leave, arrived at Peking on February 15 by the Mudken express, accompanied by the Countess.

Mr. Tetsujiro Shidate, formerly Manager of the Sumimoto Bank has been appointed President of the Industrial Bank of Japan in succession to Mr. Juichi Soyeda.

Mr. John S. Hord has been re-elected President of the Bank of the Philippine Islands. The following gentlemen were elected or re-elected to serve on the board of directors: Enrique Barrera, Maximiano Paterno, Edilberto Calixto, Phil. C. Whitaker, Thomas L. Hartigan, Félix Roxas, Leopoldo Criado, Francisco Cavero, Eduardo Díaz Pérez, Miguel Velasco, and José M. Garcia Suárez.

Mr. H. M. Rumbold, Councillor of the British Embassy at Tokyo, expects to leave for home next month. It is possible that he may be appointed Minister to Chile, which post is now vacant.

The death is reported by cable of Mr. A. R. Brown, honorary Japanese Consul in Glasgow and for many years in the employment of the N.Y.K.

Mr. Larz Anderson, the American Ambassador, and Mrs. Anderson left Tokyo on an extended holiday trip in Japan, Mr. Anderson having received leave for the purpose On the conclusion of their tour they started on their return to the United States, after which their movements are uncertain.

Mr. J. H. MacLaren, of the Hongkong and Shanghai Bank, has been transferred from Shanghai to Yokohama, where he will be sub-manager of the Bank's agency.

Dr. Sun Yat-sen, after a most successful visit to Japan, returned with his party to Shanghai at the end of March.

Mr. J. W. Bolles, Manager in the Far East for the Standard Oil Co., returned to Hongkong on the 5th March. Mr. Bolles has been on vacation in the United States.

A marriage has been arranged and will take place at Berlin early in April, between Mr. C. N. Meyer, accountant of the Deutsch-Asiatische Bank at Hongkong (now on home leave) and Miss Elsa Hake, daughter of Mrs. R. Fuhrmann, of Hongkong.

WU CHING-PIEN, PRESIDENT OF THE PRESENT NATIONAL OR ADVISORY COUNCIL. MR. WU WAS NOMINATED FOR THE POST OF MINISTER FOR EDUCATION AFTER THE REJECTION OF MR. TANG HUA-LUNG

TANG HUA-LUNG, VICE-PRESIDENT OF THE PRESENT NATIONAL OR ADVISORY COUNCIL. MR. TANG WAS NOMINATED MINISTER FOR EDUCATION, BUT RATIFICATION OF THE APPOINTMENT WAS REFUSED BY THE NATIONAL COUNCIL BY ONE VOTE

Mr. J. B. Rentiers, British Consul at Tamsui, Formosa, has been appointed Consul at Hawaii. Governor-General Viscount Sakuma, says a Taipeh dispatch, entertained Mr. Rentiers at a farewell reception.

Mr. J. Barendrecht, Dutch Consul at Kobe, has been appointed Consul-General at Calcutta.

The Japanese Foreign Office is informed that Dr. Rhomberg, the new Councillor of the German Embassy, formerly attached to the Legation in Venezuela in the same capacity, will reach Tokyo early in April when he will replace Mr. von Radowitz, who has been appointed Councillor of the Embassy at Paris.

Mons. Etoret, chief of the French Post-Office at Peking, has returned to the capital from home leave, and was welcomed heartily back by his many friends and compatriots.

Mr. Edward Bowditch, Jun., has been appointed Secretary of the Moro province, Philippine Islands.

Sir W. Conyngham Greene, K.C.B., the newly appointed British Minister to Tokyo, arrived at his post, accompanied by Lady Greene, on March 5.

Mr. A. H. Keable, Manager of Messrs. Samuel and Co., Dairen, returned to Dairen on March 1 from England, via Siberia.

Mr. G. N. Courtney, of Messrs. Butterfield and Swire, Hongkong, arrived at Dairen on March 1 to take over charge of the firm's local branch.

Mr. Toyotaro Isomura, former Chief of the London office of the Mitsui Bussan Kaisha, has retired from the Company, and entered the Hokkaido Colliery and Steamship Company. In consequence, Mr. Kaneo Nanjo, Chief of the Osaka branch of the Mitsui Bussan Kaiha, has been mada Chief of the London office, Mr. Kamenosuke Fujino, Chief of the Cotton Department, succeeding Mr. Nanjo as Chief of the Osaka branch.

The appointment of Mr. E. Shellim to be an Unofficial member of the Legislative Council. Hongkong vice Mr. Osborne resigned, has been gazetted.

With the approval of the Italian minister at Peking, Mr. d'Angelo has been appointed adjudicator for public works and construction in the Italian Concession at Tientsin.

Mr. Hisaaki Hijikata, Director of the Bank of Japan, returned from London to Tokyo on February 28.

Mr. Eduardo Ruiz, First Secretary of the Chilean Legation at Tokyo has been transferred to Brazil in the same capacity.

Mr. J. Valenti, the new French Vice-Consul at Yokohama, has arrived in Japan.

At Hankow Mr. M. Trouillet has taken over the management of the Banque de L'Indo-Chine from Mr. Dezaunay, who is transferred elsewhere.

The staff of the Tientsin Technical College has been increased by the addition of Dr. E. Rusch, formerly Professor of Electricity in the Zurich University.

PUBLIC WORKS

Philippines Appropriation.—The Philippines Assembly has agreed to an appropriation of P.5,412,202.53 for public works. This is the largest public works appropriation ever passed by the legislative body. Of this sum P.2,050,000 was allotted for roads and bridges, which, together with the fixed annual appropriation of P.500,000 brings the total allowance for this work up to P.2,550,000. Following is a complete list of the items in the public works appropriation:

IMMEDIATELY AVAILABLE	
For Hospital grounds..	P.15,000.
For Quarantine launch.	25,000.
For Roads.	800,000.
For Artesian wells.	100,000.
Reimbursement for Cebu Custom House	17,202.53
Total	P.957,202.53
AVAILABLE JULY 1	
General Hospital Kitchen	P.25,000.
Culion construction work	50,000.
Sibul Springs	20,000.
Bullock Bullock Springs	15,000.
Weather Bureau..	1,000.
Roads	750,000.
Artesian wells	400,000.
Port district streets	50,000.
Cebu dredging and filling	35,000.
Mariveles wharf	50,000.
Lights and Lighthouses	25,000.
Telegraph, telephone and cable.	50,000.
Coast and Geodetic Survey launch	3,000.
Iloilo Custom House	225,000.
Manila Trade School	275,000.
Municipal Schools	150,000.
Bureau of Agriculture construction work	50,000.
Prisons	20,000.
Philippine Library books	15,000.
Total	P.2,209,500
RELEASED BY GOVERNOR-GENERAL AFTER JULY 1	
Insane Asylum at San Lazaro..	P.10,000.
To investigate medicinal springs	15,000.
Bureau of Science Laboratory, etc.	50,000.
Constabulary barracks	50,000.
Roads	500,000.
Municipal wharves	75,000.
River control..	100,000.
Sea going dredge	400,000.
Iloilo sea wall	200,000.
Improvements at minor ports ..	60,000.
Wireless system	300,000.
Los Baños laboratory..	30,000.
Prisons	50,500.
Rizal Hall, Philippines University	300,000.
Los Baños government farm ..	25,000.
Cebu port improvements	40,000.
Iloilo port improvements	40,000.
Total	2,245,500.
Grand Total	P.6,412,202.53

Beautifying San Pablo.—The "city beautiful" idea has seized the enterprising citizens of San Pablo, La Laguna, P.I., and they are going to adorn the landscape with avenues of palms, gardens and lawns and lay out a magnificent park about the confines of Sampaloc Lake, which occupies the crater basin in the suburbs of the municipality. Sites will be designated for public buildings to be erected from time to time and consulting architect William E. Parsons of the bureau of public works is to design the whole scheme with a view to general harmony of landscape and architecture.

"New Escolta" at Manila.—The Manila municipal board has decided upon the expropriation of the buildings and land on the south side of that part of calle Dasmariñas which connects calle Rosario with calle Anloague. The street is to be widened from its present width of eight meters to seventeen meters. This is part of the general "New Escolta" project. The cost of the expropriation of the property mentioned will approximate P.120,000, the land being valued at P.50,000 to P.60,000 and the improvements at P.60,000 to P.70,000. The expropriation of this part of Dasmariñas will bring the western end of the "New Escolta" as far as calle Anloague. It will eventually be extended to the Binondo draw bridge, but the portion between calle Anloague and the bridge will require the expropriation of very little property, as the section of Dasmariñas is already fairly wide. Only a narrow strip of the corner property will be expropriated.

The Kwangtung Leased Territory.—The Public Works Department of the Japanese Leased Territory of Kwangtung, for the next fiscal year, will have at command only Y.70,000 for the construction and repairing of roads and Y.50,000 for the drainage system, both items to be defrayed from the national treasury. In addition, there will be a small amount of funds available out of the local revenue for roads in the rural districts. Even the Y.50,000 disbursed annually hitherto as an extraordinary list has been struck off the Budget. In consequence, no fresh undertaking can be promoted in the coming fiscal year in the line of public works.

Wharves at Pukow.—It is reported that contracts have been let for the building of five new wharves at Pukow, the terminus of the Tientsin-Pukow Railway, the total length of which will be about a quarter of a mile.

New Capitol for Pangasinan.—The province of Pangasinan P.I., has selected a new site on the shore of Lingayen gulf, a little more than one kilometer from the present town center for its premanent provincial capitol. The site selected has the practical advantage of being high and dry ground. The area acquired contains about 20,000 square meters, most of which is shaded with coconut trees. According to plans recently prepared by William E. Parsons, consulting architect, the group of buildings includes the provincial government offices, a court house, a building for future expansion, a prison and store houses. Of these only the provincial building and the store houses are intended for immediate construction. The cost of the former will amount to probably P200,000, and the latter P30,000. The plan prepared by the architect includes also a comprehensive lay-out of streets, parks and playgrounds, a municipal center and a market place. A part of the provincial grounds not required for buildings will be laid out as a park, and divided into lots for residence sites.

Hun River Bridge.—The bridge over the Hun River on the road between Chienchinchai (Colliery Town) and the old town of Fushun, Manchuria, is to be constructed by Messrs. Okura & Co., who have secured the contract. Part of materials and men required have already arrived, and the foundation work will be put in hand shortly.

Bridge Work in Northern Luzon.—Mr. C. W. Keith, chief of the division of engineering design, bureau of public works who in January made a trip through the provinces of Benguet, La Union, Ilocos Sur and Ilocos Norte inspecting bridges reports that all bridges on the Benguet Road are being strengthened to carry the new 10 ton automobiles which will probably be used during the coming season. Mr. Keith inspected the site of the Laoag Bridge in Ilocos Norte, the substructure of which will be constructed by Mr. Daniel Galza of Laoag. This bridge, when completed, will be the longest steel highway bridge in the Philippines, having seven 160 foot spans. The work on the substructure has just been started and the contractor should be making rapid progress towards its completion. In Ilocos Sur Mr. Keith visited the sites of the four bridges to be constructed by Contractor A. F. Allen. Work is now being prosecuted diligently on the longest structure, the Cabugao bridge, which is 168 meters long. Mr. Frank James, who is associated with Mr. Allen, is in charge of the work.

Wuchang Communications.—The Wuchang Government has passed a resolution in favour of extending the "Chang Kai" from the terminus at the old provincial treasurer's yamen straight to the bund, where another gate will be opened between the Hanyang gate and the Wushun gate. The making of this extension of the "Chang Kai" will have the supreme advantage of allowing of much quicker communication with Hankow. With the proposed new gate between two near neighbouring gates and facing the most prosperous part of Hankow city, besides being backed by the busy "Chang Kai," this extension will be of the utmost advantage in stimulating an increase of trade between the Wuhan cities. The length of the extension is not great and the cost of the purchase of land and houses will be comparatively small and it is considered that the finances of the Wuchang Government will be quite able to meet the outlay.

WATERWORKS, IRRIGATION, ETC.

Irrigation in the Philippines.—The Irrigation Council at Manila has received an application from Adriano Guintu of Macabebe who requested rights on the Sampaga river, a branch of the Rio Sapalibutad lying in the municipalities of Minalin and Macabebe and asked for 100,000 liters of water per minute to be diverted to his land. The council decided to grand 691.34 liters per minute to irrigate the land that involved only 691.34 hectares. The construction in this case includes a dyke 20 meters long, ten meters wide and ten meters deep. This will be a gravity system. An application from E. L. Worcester was for 630.9 liters of water per minute from the Mudcong creek north of the applicant's land in the sitio Matoas na Cahoy, barrio of Val de Fuente of the municipality of Cabanatuan. The council authorized 504 liters per minute. The construction in this case involves a dam four meters high across the stream, from this the water is to be pumped with a lift of nine meters and run through a flume 108 meters long to the head of the ditches.

Dairen Waterworks.—The proposed extension of the source of water supply on the Malan River at Kanchiatun, which has been planned on a four years' programme, involving the proposed outlay of Y.300,000 for the first year (the fiscal year 1913), stands in danger of being rejected. The Department of Public Works foresees the contingency of a water-famine for the city of Dairen in two years' time, and has drawn up a plan for meeting the increasing requirements on a temporary basis, which will cost only about Y.50,000.

San Pablo Waterworks.—Governor-General Forbes has set aside for watershed purposes an area of 2,303,927 square meters of public domain in the sitio of Kabunsud, barrio of San Diego, municipality of San Pablo, P.I. The San Pablo waterworks will be built from funds derived from the revenues of the municipal market in the town. A loan was obtained from the insular government for the construction of this market a couple of years ago. A year after the market was opened the town had derived enough in revenue from it to pay back the loan to the insular government. But a waterworks was desired by the people of San Pablo, so it was decided to keep the loan a while longer, add some more of the market revenues to it and have running water. This scheme is now nearing realization without the necessity of obtaining additional loans from insular funds.

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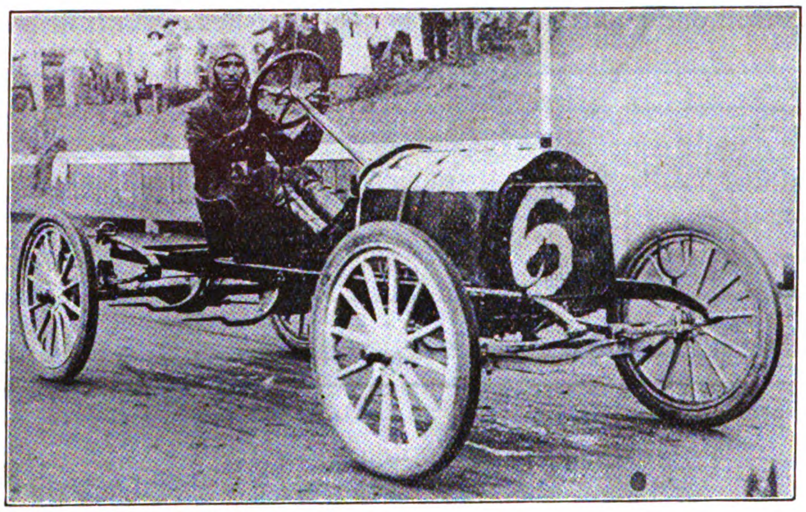

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THE FAR EASTERN REVIEW

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Engineering

Finance ❀ Commerce

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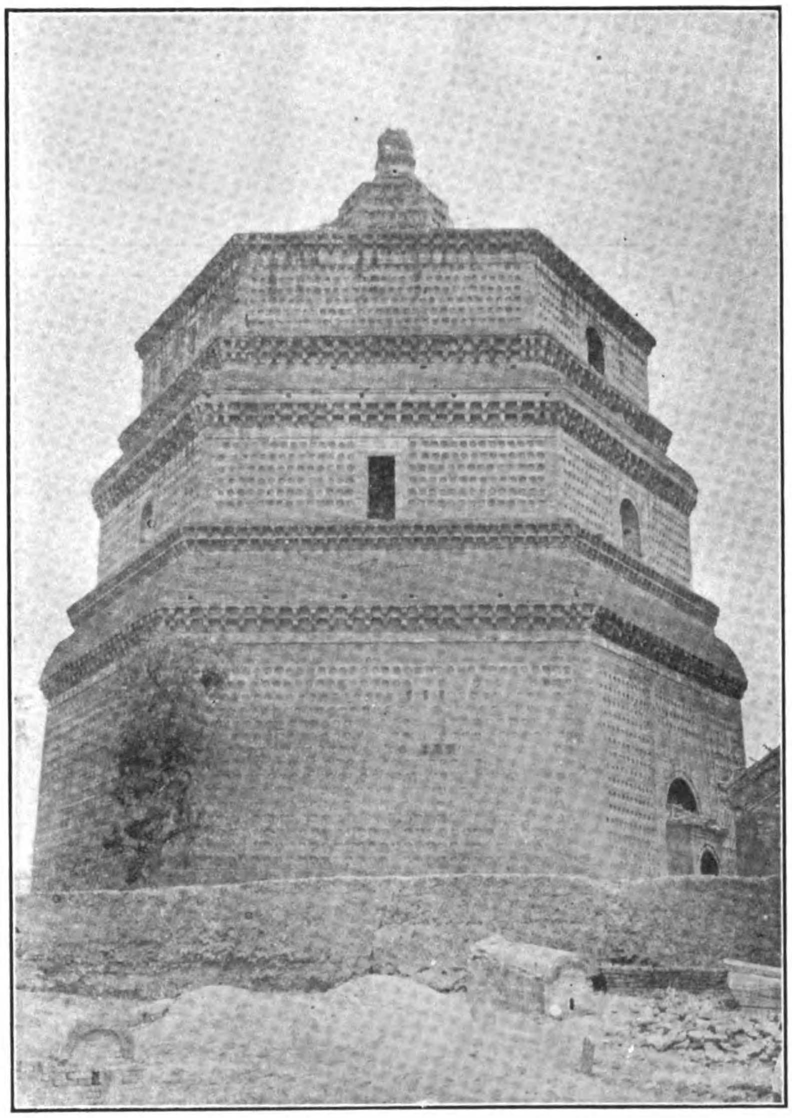

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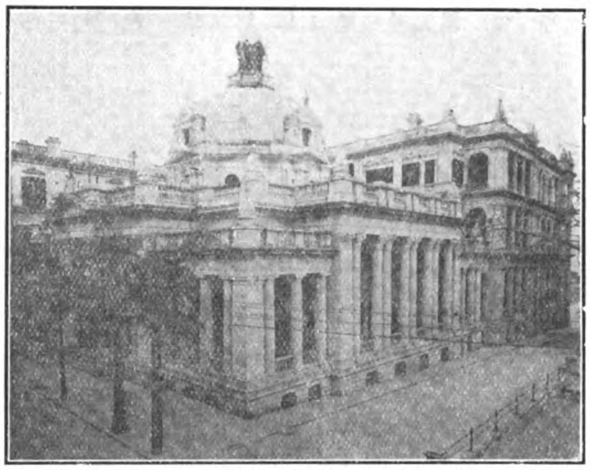

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, APRIL 1913 No. 11

THE LUNG-TSING-U-HAI RAILWAY

Description of the Projected Line from Lanchow to the Sea

The most important railway that has been projected in China for many years is that which is destined to connect the sea with Lanchow, the capital of Kansu Province. It will pass through four provinces, Kansu, Shensi, Honan and Kiangsu, and therefrom it derives its name, the "Lung-Tsing-U-Hai Railway"—"Lung," meaning Kansu, "Tsing," Shensi, "U," Honan, and "Hai," the sea. A loan of £10,000,000 was arranged in September for the construction of this line, and on March 31, the first portion of that amount was raised in Belgium. Subscriptions were invited for £4,000,000, and it is stated that subscriptions were sent in for £6,000,000. The Agreement for this loan, which was published in the January number of the FAR EASTERN REVIEW, sets out that it is for the construction and equipment of a trunk line which will connect Lanchow-fu (the capital of Kansu province), in the west, to a seaport, to the north of the Yangtsze River, in the east, making use of the already constructed Pien-lo and Lo-tung sections, and eventually the Tsing-kiang-pu railway branch, and passing through Sian-fu (the capital of Shensi province), Tung-kwan, Honan-fu, Kaifeng-fu (the capital of Honan province), Kweiteh-fu, and Suchow-fu in the province of Kiangsu, to the sea.

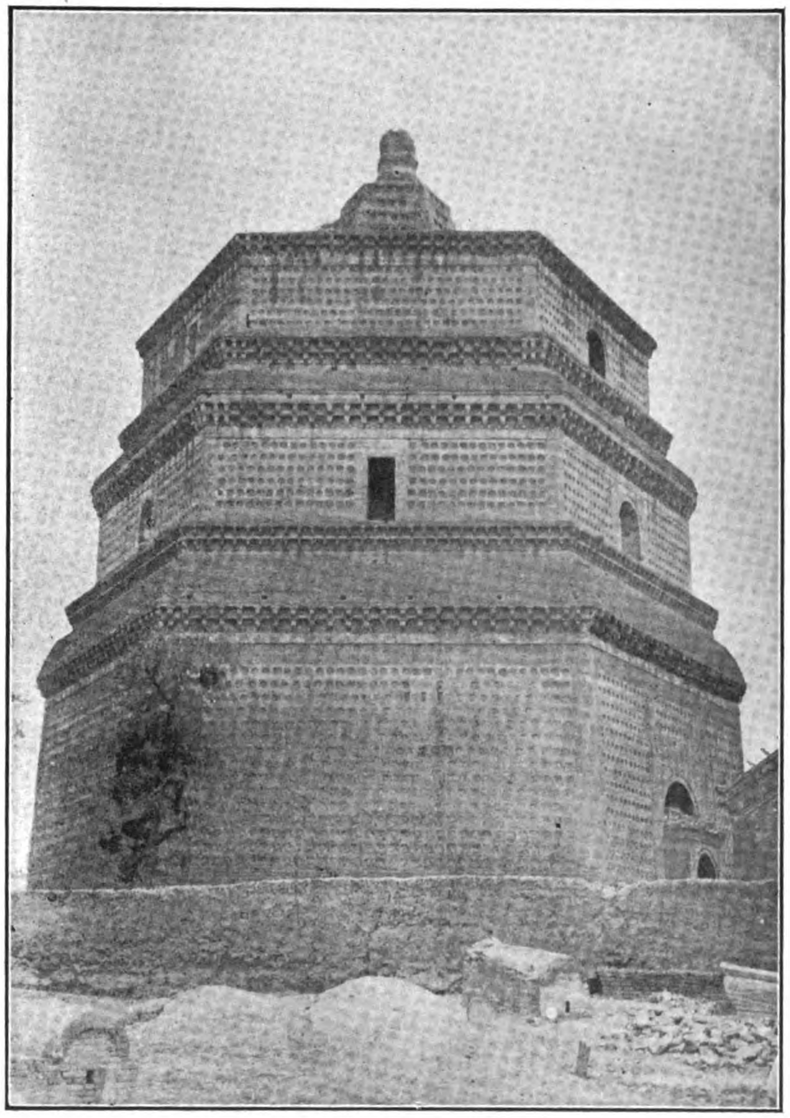
The railway will pass through one of the most important sections of China on its way from Honan westwards, by following the famous Tungkwan road. This is probably the greatest military road in China, and is supreme in importance in a strategical and political aspect, as it mediates without exception the natural traffic between the southwest of the Republic and Peking, together with the whole north-east. By traversing the Tungkwan road to the west the equally famous Wei River valley is entered.

All the historical, political, strategical, commercial, and social interests of North Shensi centre in this large loess basin, through which lies the lower course of the Wei River.

The Wei River is the largest affluent of the Yellow River, and is navigable for very small boats from its mouth to Hanyanghien, a lively commercial place 14 miles west of Sianfu, and 140 miles from the mouth of the River.

The Wei River is bordered on its south side for from one to sixteen miles by high mountain ranges. In some places it is separated from rock precipices only by a low and level terrace made up of strata of regenerated loess, and impregnated with alkaline salts; in others true loess occupies the intermediate spaces and covers the surface to a great altitude.

North of the River, the ground rises gently.



THE PUEH TOWN AT KAIFENG-FU

As far as the eye can reach, there is a gentle rising plain of loess, slight swellings in the distance marking the position of hills covered with loess, which expose their rocks only in gullies.

This is the very centre of the loess region. The province is practically covered by an almost continuous sheet of loess of great thickness. Everything is yellow, even the atmosphere is seldom free from a yellow haze which is due to diffusion through it of fine dust or loess.

The Wei Basin forms the greatest agricultural country in the north-west, and to this circumstance, next to its geographical situation, it owes the prominent part which it has played in the history of China, especially in its early epochs.

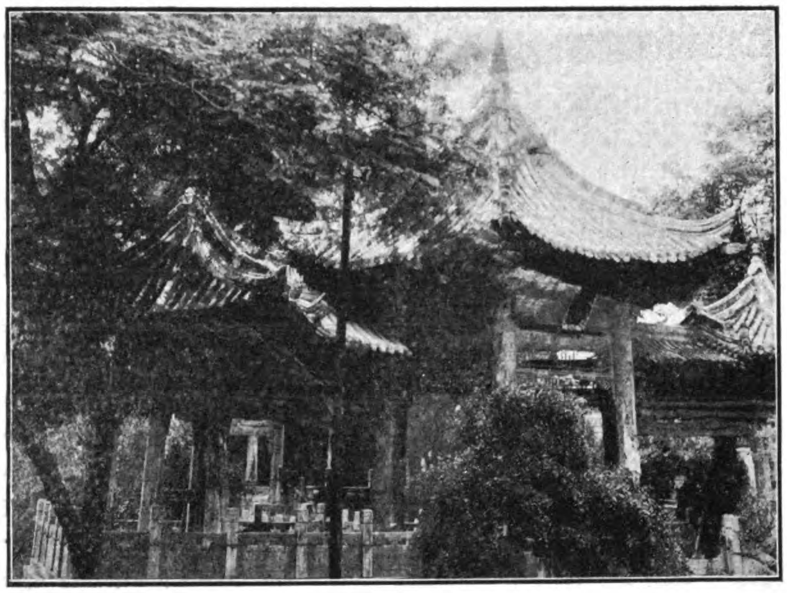
Immediately upon entering the Wei Basin from the east the impression of its peculiar position is vividly conveyed to the traveller. He finds himself suddently arrived at a point of view from which he believes to see spread out before him, like a map, an immense portion of Central Asia with its roads and routes of commerce to Turkestan and Ili, its peculiar and equally exceptional political conditions, and its turbulent history, marked by the periodical fluctuation and displacement of nationalities and spasmodic events, many of which resulted in an unparalleled destruction of human life. Most of these gigantic movements reacted powerfully upon the region of which the Wei Basin forms the central and most important portion, and some of them actually extended with all their terrors to the Tungkwan Gate.

In the Wei River Valley, in the centre of Shensi, stands Sian-fu, the capital. This may be considered one of the most important cities in China not only because of its historical reminiscences, but also because of its site, the number of inhabitants, and its wealth. Shensi is considered the cradle of the Chinese race, and commands all passes to the great western plains, leading to Central Asia, and, thanks to the Szechuan road, it connects easily with the south of China.

Sian-fu was founded in the 12th Century B C., and was the capital of China for upwards of 2,000 years. It has suffered many reverses of fortune and during the Mohammaden Rebellion was besieged for two years. Its walls enclose a square space of six geographical miles, and the gateways of the city are described as being even more picturesque than those of Peking.

Sian-fu acquired its greatest celebrity during the T'ang Dynasty. It was then called Siking (Western Capital). In 1900, when the Boxer Insurrection broke out, the court withdrew

MOSQUE AT SIAN-FU



MOSQUE AT SIAN-FU

there for a time. A short distance from it, towards the east, the Annals of Confucius, and persons familiar with them, were burnt under Emperor Shih Hwang-ti (246-209 B.C.) The Mussulmans, who are said to have arrived there about the VIIth century, occupy quite extensive quarters, and have a famous mosque. Not far from the city, towards the west, is found a slab bearing date from the VIIIth century, and testifying that the Nestorians, an heretical Christian sect, were established there at that time. A celebrated museum, called the Peilin (forest of slabs or stone tablets) is rich with the remnants of ancient civilization. The city has its Tartar quarter, which is surrounded by a high wall. In the centre of the town, there is a large agglomeration of petty shop-keepers. The Eastern suburbs is a very populous and rich quarter where cloth, silks, porcelain, foreign-made articles and iron are stored. In the year 1899, a cotton mill was established within the city.

Sian-fu occupies a dominant position because it is situated at a confluence of the few roads of travel which are the only possible connections for mediating the intercourse between the Wei Basin and the western and northern provinces, and occupy there in some measure, the place of rivers.

The only practical means of easy and cheap ingress to this region, and through it to places far more remote, is the proposed railway from Honan-fu to Sian-fu and beyond. The physical features of Western China allowed of this one and no other passage. There is, it is said, not one possible in the south or in the north except

MR. S. C. SZE, DIRECTOR-GENERAL OF THE LUNG-TSING-U-HAI RAILWAY

through Suin-hai-fu, and southern Mongolia, which is, however, through sparsely inhabited and almost unproductive regions.

The only part of the country between Honan-fu and Sian-fu which presents any difficulties lies between Tiemen and Shenchow. From Shenchow to Tungkwan, there are no other difficulties than the bridging of rivers. The rivers are deep and the plateaux are high.

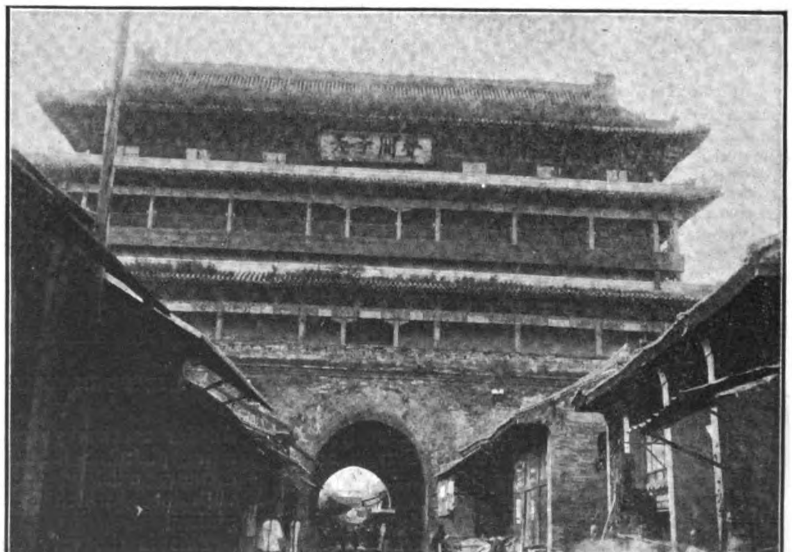
Tungkwan will probably be a great station in the future as it will naturally be the crossing point of the line proposed from Taiyuan-fu in Shensi.

From Tungkwan to Sian-fu, a distance of about 80 miles, the country is flat, and when the line is ready as far as Tungkwan, the rest of the distance to Sian-fu should be covered in six months.

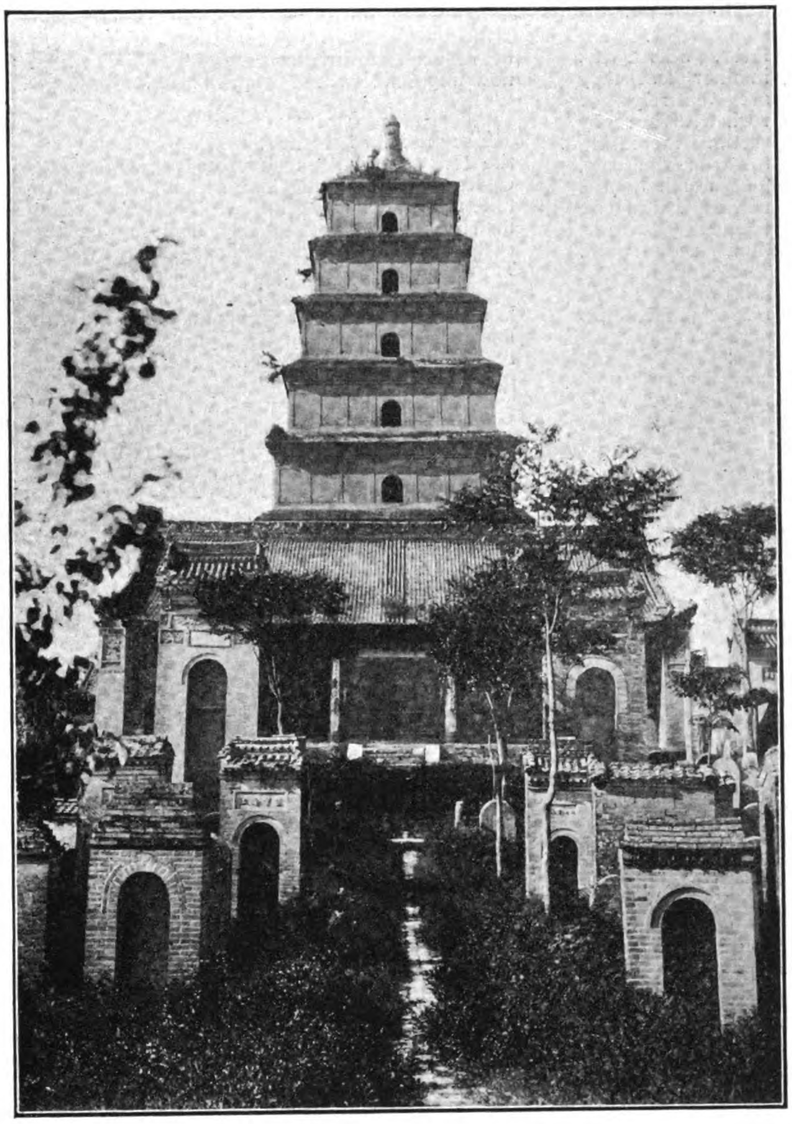
In two years' time the Construction Company should finish the line to Tungkwan, and, within three years, it should be open to traffic to Sian-fu. That is, if there are no difficulties other than those concerned with the actual building of the line.

At Lingtung-hsien, near Sian-fu, it is interesting to note *en passant*, there exist sulphur springs which may in time become famous, especially owing to their proximity of the railway. They have been used by emperors in the past and already there are a large number of buildings there which are used by those who visit the springs to bathe. Chinese people travel long distances to bathe in the waters, and with the advent of the railway they should become popular and a source of profit to the provincial government.

MONUMENT OF HUA SHAN, TUNG-KWAN



DRUM TOWER, SIAN-FU



TA YIEN TOWER, SIAN-FU

From Sianfu to Lanchow there are two roads, which may be followed by a railway. One is the cart road, called the North road, which goes through Sienyang, Kienchow, Pinchow-she, Pingliang-fu (Kansu), Tsingning-chow, Anting-kan, and to Lanchow. This road is a convenient one, with a few difficult passages.

The other road, which is called the South road, passes through Sienyang, Fengsiang-fu, Paoki-hsien, Tsinchow-kan, Kungchang-fu, Titao-chow, and to Lanchow. This road is mountainous and difficult and only practicable for pack animals. It is a cart road only from Lanchow to Tsin-chow.

The distance between Sian-fu and Lanchow-fu is about the same by either route, and is given as 360 miles. The following information is taken from a reconnaissance made by Colonel Mark S. Bell, of the British Army.

From Sian-fu by the North road a broad cart way traverses a plain growing wheat, peas, and vetches. Villages in ruins are constantly passed, and there are no indications of wealth in this rich agricultural valley. Nine miles from Sian-fu the Wei valley is some 40 to 50 miles broad, and it stretches to the north-west some 70 miles, where the undulations break up into hills rising from 500 to 1,000 feet over ravines, and on the other side of them, about Pinchow-she, wheat is plentifully grown on the elevated plateaux. Trees and shrubs are remarkably few.

For 210 miles to Lungtehsien there are no outstanding difficulties to railway construction, and there the ascent is gradual to Wating-fu. Beyond Lungtehsien the hills traversed are much more intricate and out of cultivation. These offer no great obstacle to the construction of a line. A tunnel three miles long, chiefly through loess, would be required to connect the valleys of the King-ho and that in which Lungto-hsien lies.

From Wating-hsien the road bifurcates, one branch leading westwards to Lanchow-fu and the other northwards via Kuyuan, and the easiest route for a line would be via Kuyuan. Four miles out of Wating-hsien the Liupan Pass is neared. The range rises to 8,700 feet, and forms the watershed of the tributaries of the Wei and Yellow Rivers.

From Khogapu the country to Hweining is hilly, with narrow shallow valleys and streams running in deep valleys. About Sikongyi it is composed of a number of treeless, flat valleys from one-half to one mile broad, with treeless loess hills rising steeply to 1,000 or 1,500 feet over the valleys, and connecting with each other by smaller or narrower valleys or ravines. Streams of no size, and brackish, flow in deep cut beds with perpendicular sides, into which open numerous smaller ravines cutting up the valleys and making movements, except under the border hills, difficult.

Anting-fu, the junction of three valleys, is one of the granaries of Lanchow-fu. Broad valleys like this are rare. They are reached by crossing hills, separated by narrow and intersected ravines. From the ridges one sees nothing but waves of hills, rising one over the other, beyond the immediate valleys below.

The whole road is well provided with coal. Kansu rivals Shansi in the richness and extent of its coal fields. No department of the province north of Tsingling-shan appears to be deficient of coal, and in some of them a superabundance of it is said to exist. Coal, in fact, extends over thirty degrees of longtitude.

As regards natural facilities and the supply at both ends of the line of populous productive and large commercial countries the only line that can come into consideration through this section of China is the one being discussed.

There is scarcely an instance on record where so many valuable and essential conditions co-operate to concentrate all future intercourse on so long a line upon one single channel.

A reconnaissance from Sian-fu to Lanchow-fu was made for the Construction Company by Mr. Orphanides, who started out in December of 1912 and returned in March of this year.

Mr. Orphanides traversed both the North and South roads, and while he finds no insuperable difficulties, on either route is of the opinion that it may be found advisable to cross from one to the other in order to take advantage of easier conditions.

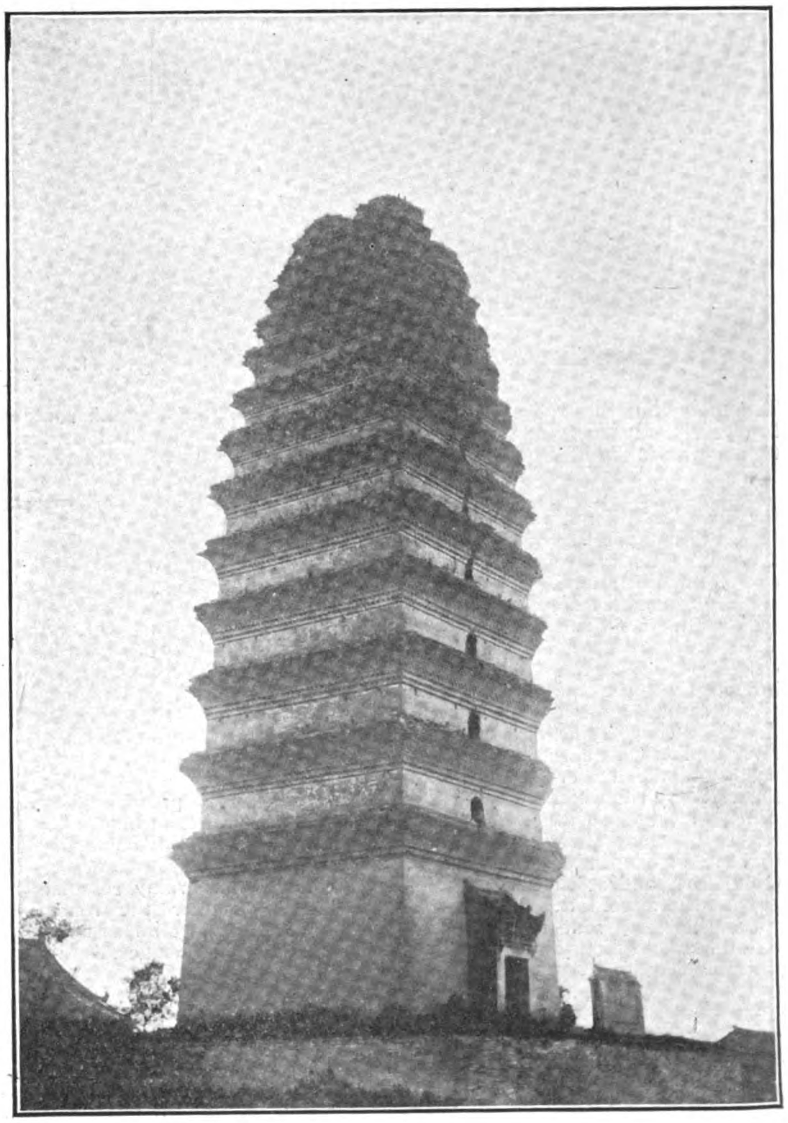
Whatever route is decided upon will, he says, entail heavy engineering work in parts.

The actual cart track on either road could not be followed. At times it mounts the crest of ranges of mountains, anon it descends into valleys, and again climbs to the plateaux, sometimes for long stretches being one series of steep ascents and descents.

If the direction of the North Road is taken a defile of the King-ho might be followed for nearly 45 miles, whilst another defile for nine miles exists between Kuyuan and Tsingning-chow.

Four mountain passes would have to be crossed, between Tsining and Lanchow, the ridges being some 700 to 800 feet above the river beds which in turn are some four to seven thousand feet above sea level.

Except for part of the route along the Yellow River near Lanchow, and the defile of the King-ho, practically all the country is loess formation,



HSIAO YIAN TOWER, SIAN-FU

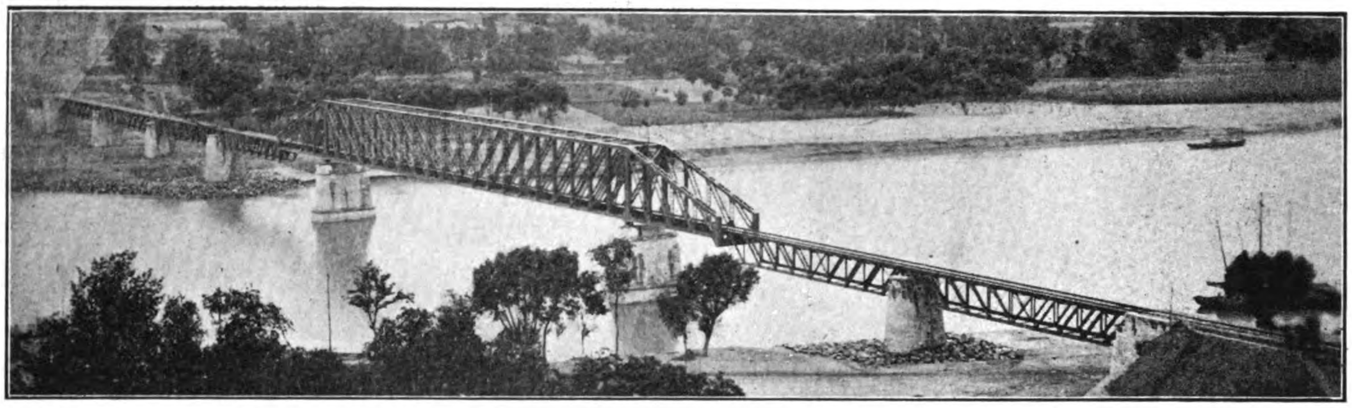
PALACE, SIAN-FU

Whereas the line will be comparatively easy of construction to Pingliang-fu the negotiation of the passes will require heavy gradients, in many cases from 15 to 25 per 1,000. On the Liupan and other passes between Wating and Tsingning-chow the grades would be particularly heavy. There would have to be some 620 tunnels varying in length from 300 to 2,000 feet, on the line from Sian to Lanchow.

There would also be many high bridges, but the spans would not be long, except in the case of the crossing of the Wei river, near Sian-fu. This bridge would have an opening of one-third of a mile.

Mr. Orphanides returned from Lanchow by the South road, and found that while carts could be used as far as Tsinchow-kan, it was only fit for mules thereafter. Mr. Orphanides branched off the road and followed the Wei river, as the most natural route, as far as Paoki. From Tsinchow-kan to Paoki the river is practically a continuous defile. Villages nestle in the larger valleys, but they are separated by ridges and gorges, the inhabitants being compelled to use narrow roads over the ranges or along the river where it is possible to have them. These roads are sinuous and undulating, and at times extremely dangerous. Having been told of the difficulties of the roads the party sent most of their baggage round by the ordinary route, taking with them just sufficient to carry them to Fengsiang-fu. After two days' experience they were, however, compelled to send the mules back, so dangerous were the roads; and the remainder of the journey had to be done on foot

If the railway should be brought along this route it would frequently have to cross the stream on account of the sharp bends, though none o the bridges would be more than from 400 to 600 feet in width.



THE LUNG-TSING-U-HAI RAILWAY.—STEEL BRIDGE 316 METRES LONG OVER THE LOHO, OPENED TO TRAFFIC ON DECEMBER 28, 1910

The mountains are, in places, loess, with rock; in other places they are entirely of rock, with the rocky sections increasing towards the east. The north of the river is more frequently loess than the south. The sides of the hills sloping to the river present no particular difficulties; there would, however, be heavy work in the shape of cuttings and tunnels, though the latter would be short, and through rock.

In many parts the hills are covered with firs and shrubs, and towards the north-west there are forests which may supply sleepers for the line.

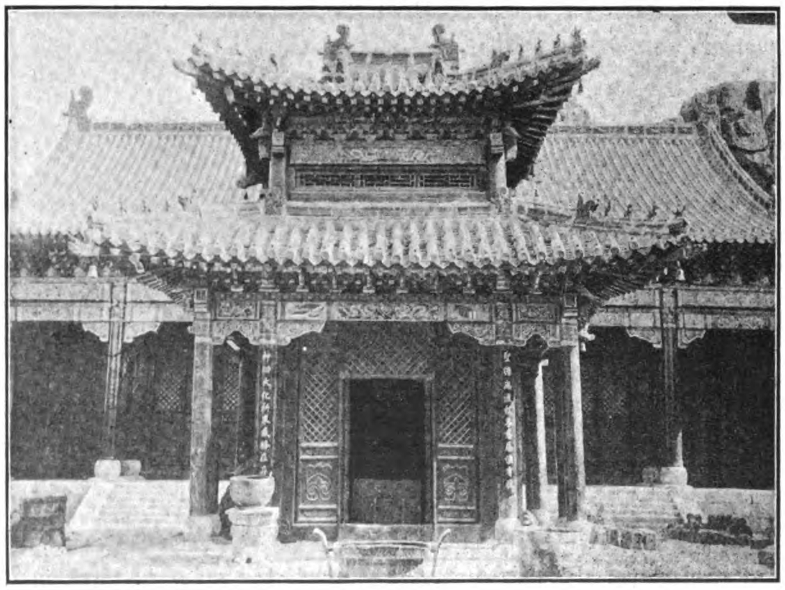
The region would provide all the building material necessary in the shape of sand, stone, gravel, lime and wood.

The cost of building a line by either the north or south route would be about the same. The north has less difficulties but more gradients, whilst the south route has more difficulties and less gradients.

It is possible that the route would utilise both roads passing from one to the other from Kungchang to Anting, thus avoiding the Liupan Pass, or if the North road is used by striking northwards to Kuyuan and thence west and south to Tsingning-chow.

With good roads it at present takes about a month to travel from Sian-fu to Lanchow-fu, but rainy seasons render the roads almost impassable, and extend the time of the journey to two or three months.

A great deal of traffic passes over the route, but breakable articles are difficult to transport. At present a one-ton mile costs about 30 cents between Sian-fu and Lanchow-fu, but with the railway this would be reduced to three cents, and a goods traffic now impossible would be quickly developed.



HSIANG KUE ABBEY, KAIFENG-FU

THE CENTRAL SECTION

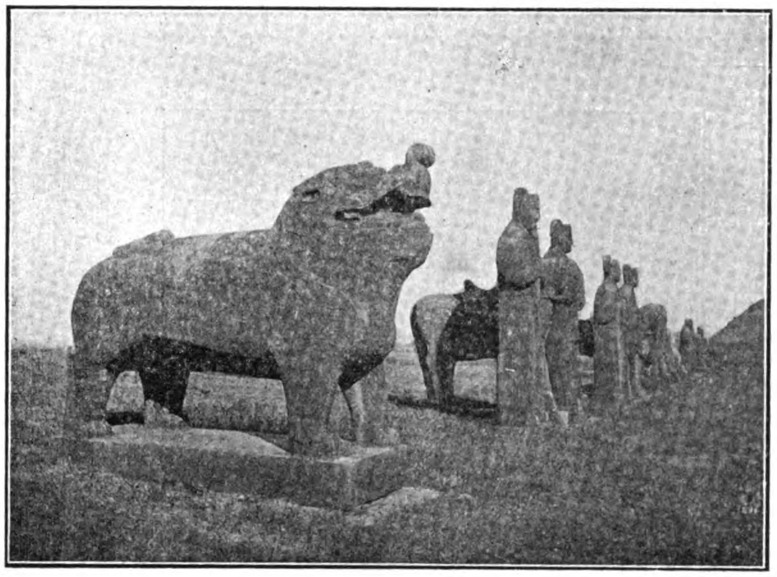
The section of the railway which will traverse the Honan and Kiangsu provinces will be the easiest to build. The Company will be able to take advantage of the line which already exists in Honan province between Kaifeng on the east of the Peking-Hankow Railway and Honan-fu on the west.

The line, which is known as the Pien-lo railway, is 115 miles long, and was built with loan money raised by the Syndicate which is responsible for the flotation of the loan for the main line.

To the west of Honan-fu is the Lo-tung Railway, and if satisfactory arrangements are made with the Chinese Company who are building this line, that will also be used as a part of the main trunk line. Already over 30 miles of the railway have been laid and 70 miles of earthwork have been completed. It was designed to connect Honan-fu with Tungkwan, and traffic is now opened to Tiehmen.

This line is distinctly commercial, and is owned by the gentry of Honan. Efforts have recently been made to acquire the railway for the Government, and 200 shareholders met early in April and discussed the question for three days before coming to a decision. The majority of the meeting favored nationalization of the line, and unless unforeseen circumstances arise, an agreement will shortly be come to with the Government. If the owners of this line object to nationalization, then a separate line will have to be built from Honan-fu.

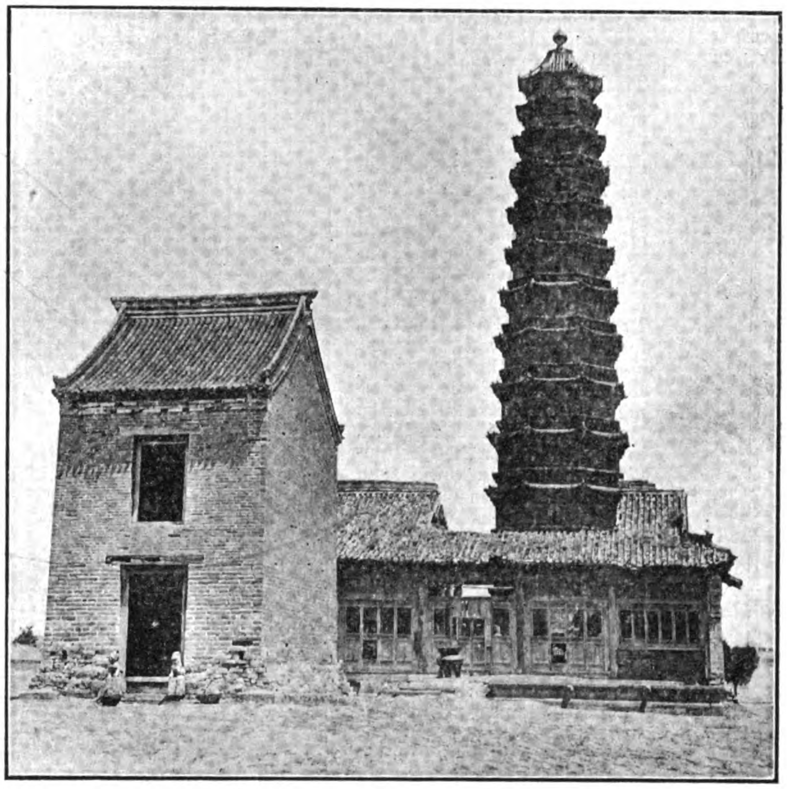
On the east side of Kaifeng-fu, the line will run south-eastwards, in the vicinity of the old



SUNG TOMBS, KAIFENG-FU

course of the Yellow River, and will cross the Tientsin-Pukow Railway at Suchow-fu. From Suchow-fu, it will continue south-eastwards to Tsingkiang-pu, on the Grand Canal. At Tsingkiang-pu, another short section, named the Tsingkiang-pu-Yang-chuang line will probably be taken over. It is about 20 kilometres long.

From Tsingkiang-pu, there is still doubt as to which route the railway will follow. It is shown later that Haichow is impossible as a port, and therefore the line will have to be taken to a port on the Yangtse River. In such a case, it will strike south-eastwards from Tsingkiang-pu to Fowning, and follow the old road through Yencheng, Tungtai, Jukao, and to the River.



IRON TOWER ABBEY, KAIFENG-FU

Search for a Seaport

One of the greatest difficulties which confronts the Construction Company is to find a suitable harbor on the sea coast as a terminal. There are very few places, if any, between Tsing-tao and the Yangtsze River which might be converted into a suitable port for the handling of shipping, and this is particularly what the Chinese desire, and in fact should have. At present the development of Tsing-tao, the best natural harbor on the coast, threatens to wrest from any other place the possibility of prosperity as a port to handle the traffic which is bound in the future to come from the interior of China with the extension of railway communication.

Tsingtao has a very marked advantage over any port to the south, inasmuch as it is one where the largest sea-going vessel might enter and discharge cargo.

In connection with the trunk line Haichow has been talked of as a port, but that portion of the coast is impossible, owing to the shallows caused by the immense amount of silt deposited by the Yellow River. However, to determine the most likely spot Mr. A. J. H. Charignon, Adviser to the Board of Posts and Communications, was despatched to investigate.

The only places that could come within consideration were Lin-hung-kow, at Haichow; Kwan-ho-kow, at Haichow; Tung-yang-kang, at the mouth of the old Yellow River; Hsin-yang-kang, at Yen-tcheng-hsien, and the Haimen Channel.

Much hope was placed in being able to use Haichow as the sea terminus of the line by dredging a harbor, but the survey made under the direction of the Coast Inspector of the Maritime Customs shows that such a scheme is impossible. At ebb tide there is not twelve inches of water at the mouth of the river, whilst between Hsi-lien-tao and Hsu-kow the water does not reach a depth of six feet.

Whilst Haichow would not be suitable for the terminus of a trunk line, it might well be connected by a branch line from Tsingkiang-pu owing to the industry carried on there in connection with the manufacture of salt, oil and flour, etc.

So far as the old Yellow River mouth is concerned moderate sized steamers could not enter at any point. Existing maps are incorrect as showing the old mouth as an estuary, for in reality there is only a distance of from one to two miles between the old dykes. So little depth exists here that even a small steam launch may not navigate the stream.

Hsing-yang-kang is the best available place on this part of the coast, but no matter how good the actual port, there is an immense sand bank outside which would prevent even the smallest steamer entering. Hsing-yang-kang is the centre whence corn, rice, and other grain grown in the districts of Yen-tsecheng and Fowning, is exported, and salt from the salt pans in the vicinity is sent inland, but the export is all done by junk. For this reason it may be a port to which a short branch line might profitably be laid.

The Haimen Channel on the Yangtsze remains as the only place where a port might be established, though even that channel is rendered somewhat difficult by virtue of the numerous sand banks which exist. Dredging would have to be undertaken to permit of deep draught vessels entering, but shallow draught boats can already reach the port, and do keep up a regular connection.

At Ta-kang there is a depth of 30 feet, and the location gives protection in case of storm.

Observations show, too, that the Haimen Channel is likely to grow wider and deeper, whilst the Gutzlaff and Wei-shan channels are showing gradual silting.

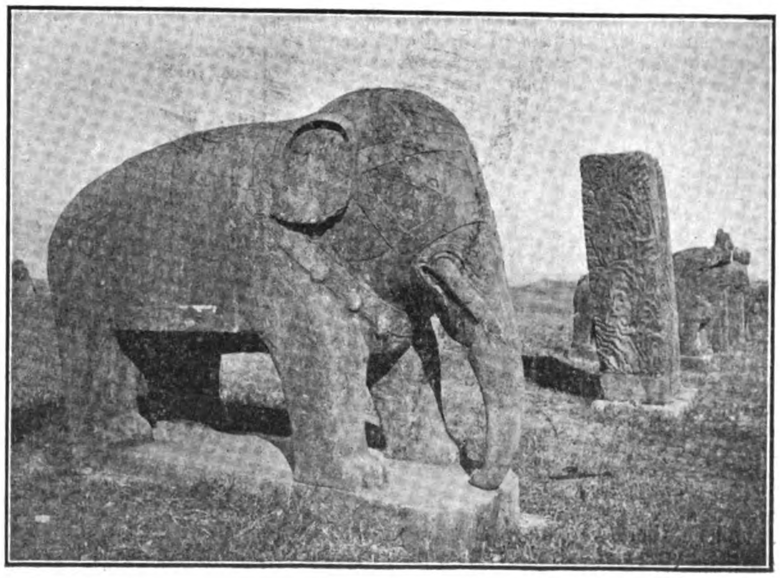
The conclusion of Mr. Charignon is that Ta-kang could be made a suitable terminus, though the opening and management of the port would necessitate large initial expenditure.

The port of Tungchow, known by its native name of Tien-sheng-kang, is already a port of call for Yangtsze steamers, and is about eight miles from the city of Tungchow. It would be of immediate service to the railway in permitting the discharge there of railway material, and after the line is built would be a port for steamers without any particular additional expenditure.

After exhaustively investigating various places, and examining the routes of commerce, the surveyor came to the conclusion that a location of the line from Tsingkiang-pu to the seaport of Kwanho-kow, via Antung-hsien, and the south bank of Ta-tchao-ho, would be by far the most advantageous. Unfortunately the construction of this line would depend upon the improvement of Ta-tchao-ho, and unless the people of Haichow took immediate and comprehensive action, the construction of this line would be impossible.

The location from Tsingkiang-pu to the Yangtsze River via Fowning, Yencheng, Tungtai, Haian, Jukao and Nan-tung-chow to the small but extremely useful harbor of Tien-shen-kang would be a good one if Haimen (Ta Kang) proved to be a good anchorage, with a south channel of easy entrance. During the period of construction, it would not, however, serve any useful purpose. If Haimen proved to be of no value as a terminus, then the trunk railway would have the harbor of Tien-shen-kang at

(*Continued on page 474*)



SUNG TOMBS, KAIFENG-FU

THE INAUGURATION OF CHINA'S PARLIAMENT

The Inauguration of the Parliament of the Chinese Republic took place on April 8, the second year of the Republic, at Peking. The ceremony was held at the Chung-yi-yuan, or House of Representatives, the procedure of the Inauguration having been arranged beforehand by the Preparation Office. Parliament commemoration badges were presented to the visitors. The Ministry of Communications was also ordered to print Parliament Commemoration Postage Stamps. They have not yet been issued. The Chief Administrators in all the Provinces, as well as the Resident Officials in Mongolia, Tibet, and Ts'inghai were telegraphically ordered to celebrate the day. The Ministry of Foreign Affairs informed the Ministers of various countries of the Inauguration, and also instructed the Chinese Ministers abroad to announce to foreign countries that the First National Assembly was inaugurated on the 8th of the Fourth Month of the Second Year. The Ministry of Education instructed the authorities in the schools of the whole country to give a holiday on that date. The Police Stations of Peking instructed all merchants to fly the national flag and celebrate the day.

One day before the Inauguration, circulars were issued announcing the Order of Ceremonies, as follows:

CHINA'S PARLIAMENT.—MR. TING-CHI-SENG, THE SECOND OLDEST MAN IN THE PARLIAMENT; AGED 66. HE IS FROM FUKIEN AND WAS TEMPORARY CHAIRMAN OF THE LOWER HOUSE

1.—At 9 a.m. all Representatives and Senators will be present at the Chung-yi-yuan, dressed in frock-coats.

2.—11 a.m. Ceremony begins. Music.

3.—The Chief and other members of the Parliament Preparation Committee will assist in the ceremony. The Chief of the Committee will report the number of representatives already arrived, and announce that the oldest member of the Assembly shall be the Provisional Chairman.

4.—When the Chairman is appointed, the Chief of the Committee will ask him to take his place.

5.—The reading of the Eulogy.

6.—The reading of the Eulogy submitted by the President and the Cabinet.

7.—Perform three bows towards the National Flag. Music.

8.—Chairman to announce that the ceremony is finished.

9.—Taking of photograph.

The morning of the 8th was bright and beautiful. The national flag was flown in all the streets. Large crowds of visitors, Chinese and foreign, arrived in succession at the Chung-yi-yuan. Beginning at 9 a.m. the delegates arrived, produced their certificates, signed their names, and received their badges.

At 11 a.m. there were 179 Senators and 503 Representatives present. Foreigners numbered over 200, while about 1,000 Chinese were present. The bell was rung, and the ceremony began. The delegates, the special representatives of the President (who was not present) and the members of the Preparation Committee all took their seats, the members of the Cabinet present being Messrs. Chao Ping-chun, the Premier; Lu Chen-hsiang, the Minister of Foreign Affairs; Tuan Ji-jui, the Minister of War; Liu Kuan-gung, the Minister of Navy; Shu Shih-ying, Minister of Justice; Chen Tsen-hsien, Minister of Agriculture and Forestry and Acting Minister of Education; Chu Chi-chien, Minister of Posts and Communications. At this juncture, the Metropolitan Guards Corps fired 108 guns. The general aspect of the gathering was solemn and orderly.

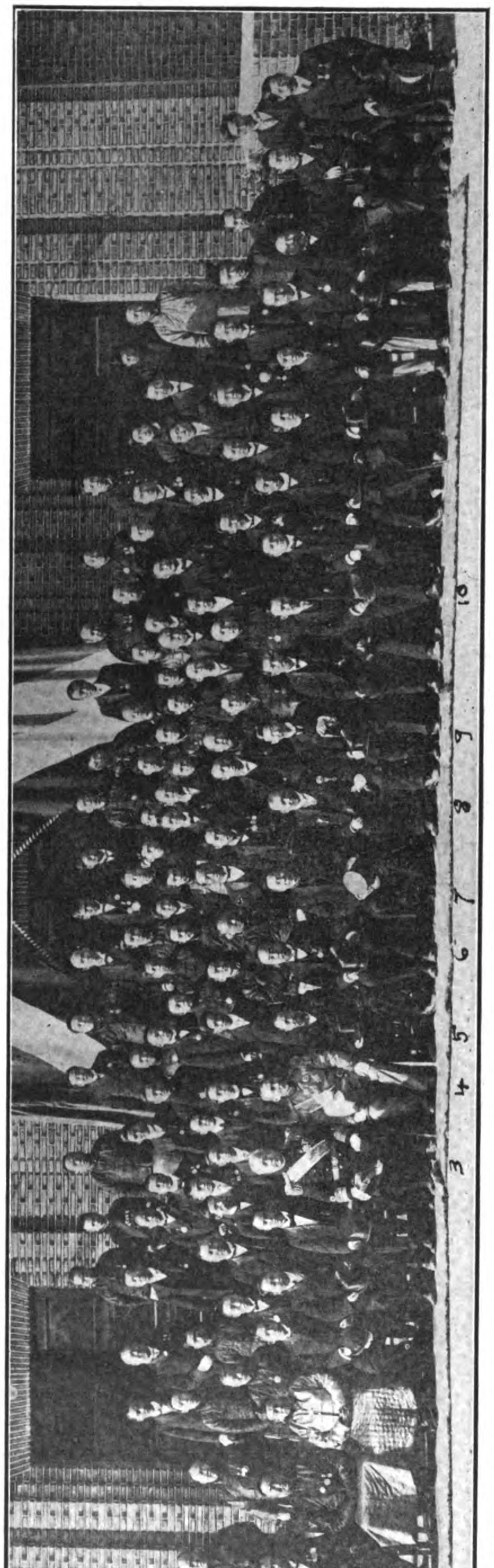
Mr. Ku Hao, a member of the Preparation Committee, announced that the ceremony of the day was to begin. The band played. Mr. Ku Hao asked the delegates to raise their hats in honor of the occasion. All the delegates stood up and raised their hats. Loud applause ensued, and, as the *Government Gazette* says, a cheerful spirit pervaded the proceedings.

Mr. Szu Yu, Chief of the Preparation Committee, made the following address:—"To-day is the day of the Inauguration of the Parliament. On the 10th of the First Month, the President, in accordance with the Provisional Constitution, issued a Mandate to the effect that all the delegates were expected to reach Peking within three months, and hoped that the Parliament would be opened as soon as possible. The period was short and the election returns at that time were not complete. In fact elections were at that time still going on, and we were afraid that it would be very difficult to have sufficient numbers present. However, it exceeds our expectations that so many have already reached Peking. According to the count made to-day, there are 179 Senators present and 503 Representatives, in all 682. We have agreed upon electing the eldest member of the two Houses to be the Provisional Chairman. After due investigation, we found that Mr. Yang Chung, Senator from Yunnan, 71 years old, is the eldest member. We move that Mr. Yang Chung be appointed Chairman."

All the delegates stood up and affirmed the selection, and loud applause followed.

Mr. Yang Chung asked Mr. Ling Chang-ming to read the Eulogy of the Parliament, which was as follow:

"To-day, the 8th day of the 4th month of the 2nd year of the Chinese Republic, is the day fixed for the opening of the first National Assembly, and



CHINA'S PARLIAMENT.—This is a group of Parliamentary representatives from various provinces. The key to the numbers under the photograph is as follows:—
1. MINISTER OF AGRICULTURE AND FORESTRY AND ACTING MINISTER OF EDUCATION (MR. CHEN TSEN-HSIEN). 2. MINISTER OF POSTS AND COMMUNICATIONS (MR. CHU CHI-CHIEN). 3. MINISTER OF THE NAVY (ADMIRAL LIU KUAN-YUNG). 4. MINISTER OF THE ARMY (GENERAL TUAN JI-JUI). 5. VICE-PRESIDENT OF THE LATE ADVISORY COUNCIL AND THE KUNGHOTANG, SINCE ELECTED SPEAKER OF THE LOWER HOUSE (MR. TANG HUA-LUNG). 6. PRESIDENT OF THE LATE ADVISORY COUNCIL AND KUO-MING-TANG NOMINEE FOR THE SPEAKERSHIP OF THE LOWER HOUSE (MR. WU CHING-LIEN). 7. THE PREMIER (MR. CHAO PING-CHUN). 8. CHIEF SECRETARY TO PRESIDENT YUAN SHIH-KAI (MR. LIANG SHIH-YI). 9. MINISTER OF FOREIGN AFFAIRS (MR. LU CHEN-HSIANG). 10 MINISTER OF JUSTICE (MR. SHU SHIH-YING).

the members of the Tsan-yi-yuan and Chung-yi-yuan have assembled in the Hall to perform the ceremony. I, therefore, respectfully utter the following words: Heaven hears and sees, and silently wields the destinies of the people below. The principle that the people should share the power of the Government, is not a novelty. The despotic monarchy has long enough marred the glory of the nation against its will, therefore, the representative system is introduced. The representatives will make known the likes and dislikes of the public, and will express the opinions and voice of the people. They will hold the helm of the country, and will be its stay. On them depends the rise or fall, the weal or woe of the nation. They should therefore view their grave responsibilities with fear and trembling. Indeed the manifold troubles and disasters are but means for the uplifting of a nation. Therefore care and energy should be unsparingly exercised. During this time of construction, I do earnestly appeal to you. It is hoped that our country will firmly establish the central authority, and that the Five Races will abandon party prejudices; that timely rain will come and the farmers will enjoy their plenty; that scholars and merchants will prosper in their respective professions; that all departments of the government will properly function; that the outside world will respect our Republic; that new life put into the old country, may live forever. You gentlemen all will certainly not be slack in the performance of your duties."

After the applause with which this address was greeted had subsided Mr. Liang Shih-yi, the President's Secretary, stepped forward and handed the Chairman the scroll containing the Presidential Message. It was not read, members deciding that as the President was not present in person there was no call for any address from him. The substance of it was as follows:—

"To-day, the 8th day of the 4th month of the 2nd year of the Chinese Republic is the date of the inauguration of the first National Assembly of the Chinese Republic. This is a most glorious date in the four thousand years' record of the history of this country, and indeed this is the genesis of all blessings for the four hundred million souls of China. I, Shih Kai, being one of the sons of this country, do rejoice with you all gentlemen here. This Republic may properly be considered as the outcome of the earnest heart yearnings of the four hundred million citizens of China, and this National Assembly has been organized by their desire. Therefore the sovereign rights of this country shall be vested in the nation.

"But since the inauguration of the Republic one year ago, the direct organ of the nation has, in fact, not yet been complete. Now all the members of the National Assembly have been directly elected from among the people, therefore they are proper representatives of the nation. Henceforth the Republican Government will be fully established, and the administrative authorities of this country will be more centralized. You gentlemen are all men of ability and experience, and I am confident that you will make use of your sound opinions faithfully to advance the interest of the country. Henceforth the foundation of the Chinese Republic will be firmly laid and the blessings of the Five Races will be fully realized. With one heart and united strength, it is within our expectation that China will become a strong and mighty nation, and that the Five-coloured Flag will wave gloriously all over the country. This I believe is the hope and expectation of you gentlemen and me. Therefore I should say respectfully, Long live the Republic of China! Long live the National Assembly!"

The ceremony of bowing to the flag followed. The Chairman and all other occupants of the tribune descended to the floor of the house and facing the Republican flags, solemnly bowed thrice in unison, the signal for each bow being given by the Master of Ceremonies. A band struck up, the officials returned to their places and the Assembly was then adjourned until the 10th inst.

Photographs of the members were taken in front of the building where two military bands played for some time, and occasionally the assembled company joined in singing patriotic airs.

The Commemoration Badge given to all present, was round, bearing the five striped national flag, with the characters "Commemoration of the Inauguration of Parliament." On the reverse side was engraved the Felicitous Cereal and the date 8th of 4th Month.

THE SALT GABELLE

Gradual Introduction of Reforms

Mr. Chou Hsueh-hsi, Chinese Minister of Finance, issued the following order early in April:—"The temporary policy for the Salt Gabelle is to maintain the *status quo*, but reforms will be introduced gradually. But before the facts regarding the conditions of the salt business in the provinces after the Revolution be gathered together and compiled into a book for investigation, it is impossible to make a start with the intended reforms. Formerly the provinces published records of the Salt Gabelle, but they were not only far from being complete, but in fact they are in conflict with the present state of affairs. At the end of the late Ching Dynasty it was decided that a book embodying forms for recording the essentials of the salt business be published and distributed to the provinces for use, but owing to the change of the Government the project was not carried out. Now we have devised a similar method, but the one we devised would be better than that of the last regime as it calls for more particulars. A form for recording the particulars of the present salt affairs of the Chinese Republic with explanations will be published and five copies of them will be forwarded to each salt office, which shall fill in particulars regarding the present conditions of the salt affairs of the office, and send the returns to this Ministry within three months after receipt of same, for compilation and investigation. The date of the receipt of the despatch from this Ministry and the way to carry out this order should first be reported to this Ministry."

With the order were published the following:—

Explanation for the introduction of the form for recording the particulars of the Salt Gabelle.

1.—This form has been intended to call for the facts in connection with the present Salt Administration in order that plans for the reform of the Salt Gabelle may be deduced. It is therefore desirable that the existing local conditions of the Administration should be particularly recorded in the form and forwarded to the Ministry for compilation.

2.—As the methods in the places where salt is produced and sold vary considerably, the local office may leave a blank in the form if there be no such item in the place, and may add the particulars which are peculiar to that office but not provided for in the form.

3.—There are different names for the various departments of the Salt Administration in various places, such as Tan, Chi, Chin and Tsau for the place producing the salt; and Chan, Ao, Tsun and Yuan for the godown. But the different offices should employ the names they are using now and no change is desirable.

4.—Each item or each heading under one item should be minutely explained as follows: nature, the change it has undergone, the (present) method, the advantage and disadvantage, etc., so that it would afford facility to investigate and to arrive at its essential points.

5.—In each of the items the necessary diagrams which should be filled in have been published in the form.

6.—In any locality where there are special items which cannot be grouped under any of the headings of the form, they shall be arranged under the supplementary form.

7.—The necessary local reforms and the method of reform, and practical suggestions of those who are well versed in salt problems, all shall be recorded in the supplementary form, for the information of the Ministry.

The index for the form for recording the present conditions of the Salt Affairs.

Section I. *The Producing Place.*

1.—The locality and dimensions of the Salt Yards. 2. The organization and distinction of the Yards (such as Tan, Chi, Tsau, Chin, etc.) 3. The climate of the Salt District. 4. The circumstances for the establishment or abolition of any of the yards. 5. The variety and quantity of the produce. 6. The labourers of the yards. 7. The organization of the godowns and their number. 1. The method of manufacture and the capital.

Section II. *The question of Salt and the licenses for sale.*

1. The quantity of salt produced to be apportioned to the licensed districts. State their present condition. 2. The fixed weight, and the allowance for waste. 3. The transportation.

Section III. *The transport and sale.*

1. The weight of the bag and the weight stated in the certificate. 2. The packing. 3. The method of examination. 4. The expenses required for the transportation. 5. Different sales. 6. The legal price, and the rise and fall of the market price. 7. The fixed quantity for sale and that of the actual sale.

Section IV. *The revenues in connexion with Salt Affairs*

1. The tax at the Salt Yards and its present condition. 2. The proper tax and its present condition. 3. The likin and its present condition. 4. The new and old increases in price and their present condition. 5. The contribution and its present condition. 6 The regulations for the tax of salt of the neighbouring district and the way of transportation. 7. The real condition of the profit derived from the official transportation. 8. The revenue derived from the monopoly of the merchants. 9. The real condition of the receipts from the various other sources.

A table for the total of the various receipts. A comparison of the receipts of the end of the late Ching Dynasty, with that of the present receipts.

Section V. *Expenses*

1. Particulars of the expenditure of the organ of the administration of salt affairs. 2. Particulars regarding the expenses in connection with the receipts of the revenues of salt. 3. Particulars of the expenses for the official transportation. 4. Particulars for the expenses for arresting smugglers. 5. The particulars of other expenses. 6. The proportion of the expenses to the receipts of the salt revenue.

The funds contributed and expended by the merchants. A table for the total payments. A table for the comparison of the expenses at the end of the late Ching Dynasty and that of the present regime.

Section VI. *The Organ for the Salt Affairs*

1. The organization and locality of the organ for the salt affairs (the organization of the office for the arrest of the smugglers, and its branches). 2. The origin of the establishment of the organ and its present condition.

A table for the names of the various organs and officers. A table of the salaries of the officers. A table of the pay for the officers and men who are engaged in arresting smugglers.

Section VII. *Supplementary*

1.—Particulars which cannot be grouped under any of the above headings.

2.—Suggestions regarding the salt affairs.

SHANGHAI MUNICIPAL ELECTRICAL DEPARTMENT

THE RIVERSIDE POWER STATION

On April 12 the new Riverside Power Station near the Point at Yangtszepoo, which has been erected by the Shanghai Municipal Council, was formally opened.

That great interest was taken in this material augmentation of the electrical resources of Shanghai was shown by the large attendance of ladies and gentlemen at the opening ceremony. The Chairman of the Shanghai Municipal Council, Mr. E. C. Pearce, delivered a short address, in which he paid a tribute to the Public Works Department; to Mr. T. H. U. Aldridge, the Electrical Engineer, and to Mr. F. J. Payne, the Station Superintendent, in ensuring the successful carrying out of the work. Commendation was also given to the work of Messrs. Pearce, Cardew and Snell, the consulting engineers.

The two powerful dynamos of 2,000 k.w. each, were then started by Mrs. Pearce and Mrs. H. Figge, after which the visitors inspected the building and machinery.

The station covers an extensive area by the side of the river and the cost of erection has been somewhere in the neighbourhood of Tls. 700,000. It was started in November 1911. The mains extend to Robinson Road, a distance of over nine miles.

The plant comprises two turbo-alternators of 2,000 k.w. each to generate 3-phase current at 50 cycles 6,000-6,500 volts pressure. Provision has been made for the speed regulation of the turbines to be controlled electrically from the main switchboard operating bench, so that one man will be able to control the turbines as well as the alternators, station power, and lighting circuits and the trunk feeders The advantages of this system of control, it is maintained, will be more appreciated as the station grows in size and contains more generating units. The voltage of the system will be automatically controlled by an electric regulator and fluctuations in pressure due to careless hand regulation will thus be avoided. All the auxiliary plant in the Station, with the exception of one spare steam pump for boiler feed, will be driven by 3-phase induction motors of the squirrel cage pattern and a 25-ton electrically operated travelling crane bas been provided for handling material in the turbine house.

The main high tension switch-gear was specially designed for the safe and efficient protection of the generators and feeders which it has to control. The idea has been to make it both "fire-proof and fool-proof" and to so arrange it that only by gross carelessness could accidents happen. The switches are of the remote control, electrically operated, type built into concrete outsides and situated under the gallery on the engine room floor level. The switches are liberally designed for operating under severe conditions such, it is anticipated by the officials, as may occur when the station reaches a plant capacity of 16,000 to 20,000 kilowatts. The arrangement is such that unlimited extensions can from time to time be made without interrupting the working of the station. Even when the station assumes very large proportions the control bench (which is situated on the first Gallery) will occupy but a small space so that one switch attendant should be able to control the whole of the generators and feeders.

The water for condensing purposes will be drawn from a dredged intake 40 feet wide, which has been so constructed that the Eastern side has been partly formed by the side of the pump house. The Western side consists of a concrete wall upon which a travelling jib coal crane will run. This crane will lift the coal from barges moored alongside the wall and dump it into an automatic coal weigher, whence it will pass into the conveyor. The pumphouse itself has been built at the east side of the intake. The motors for driving the pumps (which are of the submerged vertically driven centrifugal type) are fixed above ground level so that in the event of floods the circulating water supply should not be interrupted as the pumps themselves can work under water. The advantages of placing the pumps below water level were considered so great, that the higher capital cost of constructing a low level pump house were justified.

So far as the boiler house is concerned four Babcock and Wilcox land type boilers comprise the first instalment. Each boiler is designed for a working pressure of 180 lbs. per square inch and an evaporation of 22,000 lbs. of water per hour. Internal superheaters have been fitted for superheating the steam, 150 degrees Fah.

Separate Greens' economisers for heating the feed water have been provided, one for each boiler. They are fitted with the usual sets of tube scrapers which will be electrically driven.

A very important feature of the new boilers is the arrangement of the chain grate stokers and the method of applying air to the furnaces, and it is considered that the new type will effect a considerable saving in the annual coal bill. The mechanical stokers, which have been specially designed for burning very low grade fuel (but which are also suitable for high grade coal) will, in common with the auxiliaries, be driven by electric motors.

The usual brick chimneys associated with such stations are conspicuous by their absence. Instead two short steel shafts have been erected. Each shaft will be capable of dealing with a boiler capacity of 5,500 k.w. working with induced draught. The four for producing the draught are arranged separately in such a way that they have only to draw in and deliver fresh air which is forced up the draft by means of a nozzle fixed at the base of the shaft. As the fans do not have to work in a high temperature, their life, it is claimed, should be considerably longer, and the cost of upkeep considerably less than fans operating under less favourable conditions.

Three boiler feed pumps have been allowed for, either one of which is capable of supplying the four boilers. Eventually the two pumps will deal with the water for eight boilers while the third will be spare. The two pumps for ordinary use are of the rotary type electrically driven. The other pump is to be steam driven. The rotary type of pump, it is said, now finds much favor, possessing as it does many advantages over the older reciprocating type most commonly used.

The coal handling plant must attract the attention of any visitor to the station. Provision has been made for storing about 900 tons of coal in overhead steel bunkers placed above the boilers and 1,000 tons in separate bunkers outside the boiler house. The bunkers will be fed by means of a bucket coal conveyor arranged to receive the coal from an automatic weighing hopper fed by a travelling jib crane which picks the coal out of the barges. The coal will therefore be conveyed from the barge to the boiler furnaces entirely by mechanical means.

Provision has been made for handling the coal by manual labor should the conveyor plant be out of service for repairs or other reasons.

The boiler foundations have been planned to allow the ashes from the furnaces to gravitate down a slope into the basement where they can be shot into small trucks running on rails. This method has been adopted so that the ashes may be wheeled out to the foreshore where it is proposed to dump them for reclamation purposes. The gauge of the truck is one metre. The idea is that by adopting this gauge, ashes may at some future time be conveyed over the tramways system for building or road making purposes wherever required; and materials or stores may be transported from the settlement and carried direct on to the Council's property.

The following are the firms who participated the installation, with the amount tendered for the work:—

	£
Boilers, stokers, economisers, chimneys and induced draught plant—Messrs. Babcock and Wilcox	14,300.0.0
Turbines, generators and condensers—Messrs. Allgemeine Elektricitats Gesellschaft	15,025.0.0
Underground cable, bitumen, troughing and boxes - Messrs. Siemens Bros., Ltd	12,079.0.0
Main and auxiliary switch gear—The British Westinghouse Co., Ltd	2,001.15.0
Steel structural work for power house buildings—Messrs. John Lysaght, Ltd.	9,701.13.8
Coal storage bunkers, coal conveyor, crane, coal crusher, &c.—Messrs. Spencers and Co., Ltd	5,773.0.0
25 ton travelling crane—Messrs Babcock and Wilcox	920.0.0
Steam pipe work, values, &c.—Messrs. Babcock and Wilcox	2,812.0.0
Housepower transformers—The Allgemeine Elektricitats Gesellschaft.	620.0.0
Condenser Circulating pumps, pipework, etc.—Messrs. Allen, Sons and Co., Ltd	2,889.0.0
Boiler feed pumps—motor driven—The Rees Roturbo Co	520.0.0
Boiler feed pumps, steam driven—Messrs. Clark Chapman	223.0.0
Power House storage battery—Messrs. Chloride Co	111.17.0
Battery charging motor generator and switchgear—The British Westinghouse Co., Ltd	224.4.0

A CHINESE WIRELESS COMMISSION

The Chinese Ministers of War, Navy and Communications, with the Assistant-chief of the General Staff, have jointly appointed a Wireless Commission. Wireless stations are proposed for the following places; Peking, Kiangsu, Kwantung, Hupeh, Szechuan, Fukien, Shensi, Sinkiang, Altai, Suiyuan, Tsaharr, Jehol, and the Three Eastern Provinces of Manchuria, 16 places. It is calculated that 63 telegraph stations will be added to the present number.

THE LUNG-TSING-U-HAI RAILWAY

(Continued from page 471)

least, and in such a case, would not be disconnected with ocean steamers. All the construction material could be discharged at Tien-shen-kang, Pukow, and Hankow.

If the line is carried to the Yangtsze River, it will mean a little greater length than originally contemplated. From Lanchow to Haichow, the distance is put down as about 1,090 miles.

The engineers are taking all possible steps to ensure an early commencement of work. In fact, they are putting forth particular efforts to have work commenced earlier than originally expected, in order to afford substantial relief to the sufferers from famines which ravaged the south of the Honan Province.

With the Hankow Railway to transport materials from Hankow, the line to Kaifeng on the east, and Honan on the west, give great facilities for active operations at both these points, whilst materials m y also be carried along the Pukow line, whence operations could also be pushed in both directions.

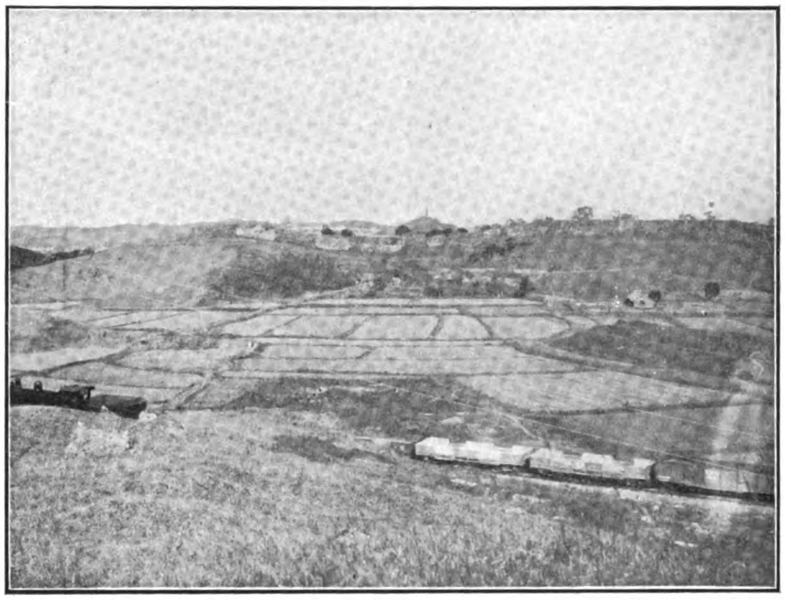
Once work has been begun, in earnest, it should not be long before the distance between Kaifeng and the Tientsin-Pukow Railway is spanned, and rapid progress should also be made from Suchow-fu to the sea. There are no particular engineering difficulties from Kaifeng. The worst feature to be faced by the engineer is the waterways and the low-lying areas in the Lake region of Kiangsu.

Some time ago, Mr. S. C. Sze was appointed to be the Director-General, and he at once commenced to push matters. We understand that Mr. Orphanides will be transferred from the Peking-Hankow Railway service and will take charge of the Eastern Section of the line, that is, from Kaifeng to the sea. The Engineer-in-Chief has not yet been appointed, but we understand that Mr. Briquet has been selected to take charge of the Western Section, whilst Mr. Charignon will be Adviser to Mr. Sze.

DEVELOPING PUKOW

In a very short time, steps will have to be taken to make the terminus of the railway at Pukow, on the Yangtsze River, possible as a residential and business centre. The site of the station is at a spot where land is invariably covered by water. Reclamation on a large scale had to be undertaken for railway necessities, and work on a much larger scale will have to be arranged for if Pukow is to become a port of any consequence. In view of possibilities of development most of the land in the vicinity has been purchased by Chinese, and we understand that some steps have already been taken to plan a settlement. It is reported that the local Commissioner at Pukow, Chuang Yun-kuan, was on a visit to Tsingtau recently, and was very much struck by the German arrangement of the port, and forthwith engaged a German Engineer to consider the establishment of a settlement at Pukow. The Engineer is reported to have made an estimate for the work, which will involve an expenditure from twelve to fifteen million dollars. We understand that the Commissioner's idea is to have an extensive wharfage and make the settlement some distance from where the Station now stands. This would be an extremely foolish procedure in view of the fact that the railway is the *raison d'etre* of a settlement and of a port at Pukow. The Chinese are notorious for the extraordinary ideas they have in connection with railway location, but if they pursue the idea that is alleged to have taken some shape, they will not only be entering upon a costly step, but one which will in time prove to be productive of constant irritation to the community. The obvious course of procedure would be to set about the development of the settlement in the immediate vicinity of the Railway station. A great amount of reclamation will have to be done, but it could be accomplished cheaply no doubt by using sand dredgers. A systematic programme of extensive reclamation, the cost of which could be participated in by al' land-owners benefitting by it, would render the work cheap, uniform, and efficient. Something of this sort will have to be done if Pukow is to progress as its importance warrants.

Already a petition signed by some 1,860 persons has gone to the Kiangpu Branch Chamber of Commerce urging the removal of the south station from Kin T'ang-men, the local name of the spot where it is situated, to Ma-Ying. The local Chamber of Commerce in pursuance of the desire of the petitioners, surveyed the proposed new site and found it satisfactory. They therefore have joined in the movement and have sent a despatch to the Department of Communications urging the change of stations. The Railway authorities selected Pukow as a site for the Southern Terminus after much deliberation. They selected it for its accessibility to Nanking, and for its wharfage possibilities. The advantages gained in these respects outweighed the fact that the site was a low one and would have to be reclaimed. Even after the selection of the site great trouble was experienced in purchasing the land. It is strange that those who are now endeavoring to change the site have kept quiet until so great a sum has been spent in building wharves and in preparing the site for the line, the station, and other buildings. It is suggested that those who head the petition in this matter are men who own land in the locality where they desire the railway station should be.

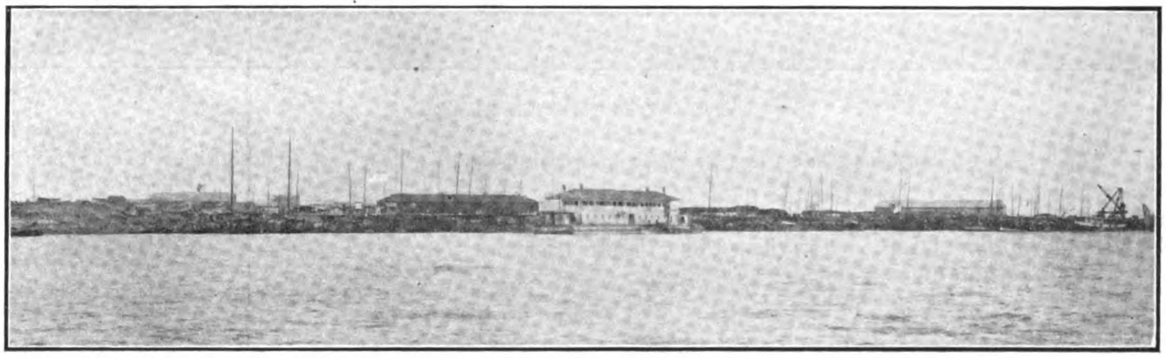


VIEW ON THE RAILWAY NEAR PUKOW

Pukow belongs to the district of Kiang-pu, and, in the past, was usually regarded as a negligible spot in the district, whilst Pu-tsen, the sister town, a little to the north, was considered to be of greater importance. Nobody dreamed that Pukow, with its low and swampy banks, often liable to be washed over during the high-water season, and not possessing even the semblance of a market, would ever rise to any degree of prosperity.

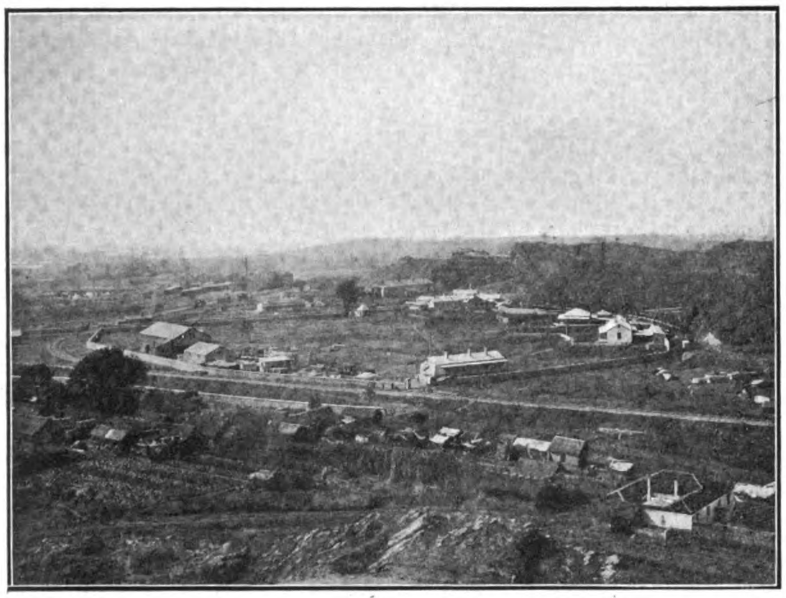
Pu-tsen is an old Hsien city, built in the fourth year of Emperor Hung Wu, of the Ming dynasty (about 400 years ago). The circumference of the city walls is 14 *li*, or a little under five miles. As can be imagined, this city, situated in an impoverished district, and without possessing in any notable degree facility of communication with the interior, has been up to the present more than ordinarily sluggish. Whether new life will be infused into it by the railway, or whether the possibilities of development at Pukow will deter advancement cannot be said at this moment, though its close proximity to the terminal station should be of advantage to it.

Four post-roads were laid out in former times to connect Pu-tsen with other towns. What is known as the south road runs parallel with the Yangtsze River. The north road passes Tungko, and goes on to Chuchow. The east road runs to Luho. The west road winds around the hills, and passes the Han-shan hills to the Hochow district. The Chinese papers report that with the opening of the port it is planned to construct either a macadamized road or a tramcar line along this West Road.



A VIEW OF PUKOW

The main canal of Pukow is called the Sz-Ch'uan-ho, or the Canal of the Four Springs. It flows into the Yangtsze at the south, and connects with Cha-ho-chi in the north. The branch canals are three in number, one of which goes to Chuantsiao; one to Chuchow and Lai-an; and the third to Luho, flowing into the Lian-ho. There are famous springs around Pu-tsen, viz., The Pearl Spring, (Chen-Chu-Chuan); the Blue Spring, (Pih-Chuan); the Tiger Spring, (Hu-



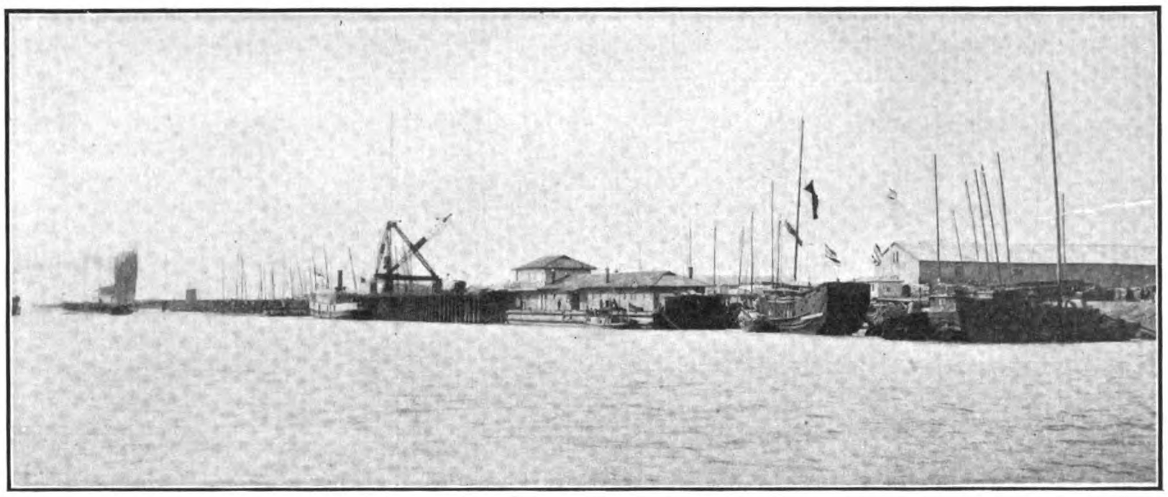
VIEW ON THE RAILWAY NEAR PUKOW

Pao-Chuan); and the Lofty Spring, (Choh Hsi-Chuan). These four Springs, during the dry season, are of great service to the farmers as sources of water-supply for the rice fields.

The most recent census shows that the population of Pukow and Pu-tsen combined is 250,000, and by far the greater part of them are mechanics coolies, and small farmers. Dealers and storekeepers only constitute one per cent. of the whole number.

To the west of Pukow there is a range of hills which goes by the name of T'ang-Chuan, where, it is stated, there exists an excellent coal field. It is reported that there are rich layers of anthracite coal under the hills, and it has been estimated that if the mine is properly worked its output would be quite sufficient to supply the whole Tientsin-Pukow line. On the north side of the hills there are groves of bamboo and trees. Many kinds of medicinal plants are found. The main cereals are rice and beans. Bamboo shoots, cabbages, water chestnuts, lotus seeds, fish, shrimps, crabs, etc., are also produced.

On the hill called Pu-ts-shan is the famous Han-tai Citadel, which used to be considered an important place in warfare. It is called Han-Tai, because it was built by General Han-Shih-chung of the Sung dynasty, who seized this hill and obtained an overwhelming victory over the K'in tribes hailing from the west.



PUKOW FROM THE RIVER

WAKAMATSU IRON FOUNDRY

General Nakamura, Director of the Imperial Japanese Iron Foundry, gave the following explanation before the Budget Committee in the Lower House (third section), of the Wakamatsu Iron Foundry:—

Since the establishment of the Imperial Iron Foundry the authorities have been concentrating their energies upon the completion of the machinery and plant and the training of the operatives. During the past three years the machinery and plant have been brought to a state of perfection, and the operatives have made great progress in skill. These are the principal factors responsible for the increase shown in the profits made by the foundry.

The manufacture of by-products, the revision of the Customs tariff, and the rise in the price of steel and iron in Europe and America are also factors in the increased profit.

During the fiscal year 1909-10, the machinery and plant were not complete, and the operatives were deficient in skill, with the result that the working of the foundry for the year resulted in a loss of over Y.800,000. In the following year these defects were remedied and a profit—amounting to over Y.50,000—was seen for the first time.

The profit increased to over Y.1,500,000 for the year 1911-12. The profit for the present fiscal year (1912-13) still remains unascertained, as the accounts are not yet settled, but the figures are estimated at over Y.2,000,000 based on a rough comparison with the preceding year.

The production of iron and steel has increased—the figures for the year 1909-10 were 100,000 tons, which increased to 160,000 tons for the year 1910-11 and 180,000 tons for the year 1911-12.

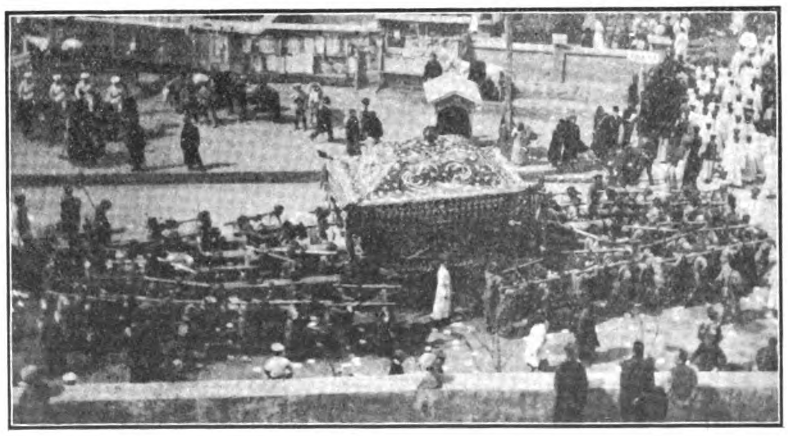
The increase in profit is attributable to the completion of the plant and the increased skill of the operatives. For instance, in manufacturing rifle barrels heavy expense was incurred in studying the process between 1904 and 1908, and it was only in 1908 that the foundry succeeded in making barrels of the desired quality. But the progress made in the manufacture of arms proved that the quality of metal formerly deemed fit for rifle barrels was not now suitable for the purpose, and further study had to be made before the ideal quality could be turned out in 1911.

The production of by-products such as pitch, sulphate of ammonia, gas, and the dregs of steel in the smelting furnace, is also partly responsible for the profit; protection and the high prices consequent upon activity in the shipbuilding industry are also contributory causes.

The increase in the price of iron in Europe and America has had a much greater effect on prices than the revision of the Customs tariff, the benefit of which, of course, cannot be ignored.

The difference in the amount of the proceeds from the sales of iron and steel for the three months—April, May and June—in 1911, preceding the revision of the Customs tariff, and the result of the sales for the three months—July, August and September—following the revision of the tariff, was not more than Y.270,000.

It will, no doubt, be difficult, if not impossible, to maintain constantly the present high price of iron. The time is not arrived to ascertain definitely the result of the working of the present fiscal year, but judging from the results up to the end of March the authorities of the iron foundry expect that 190,000 tons of iron and steel can be produced, and that a profit of about Y.3,000,000 can be obtained for the year.



FUNERAL OF THE DOWAGER EMPRESS.—THE CATAFALQUE ENTERING THE PEKING RAILWAY STATION GATES FOR ENTRAINMENT TO THE WESTERN TOMBS. *Specially taken for the Far Eastern Review.*

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RUSKIN AND THE TSIN-PU RAILWAY

The difference of opinion that has developed in connection with the respective merits of the railway stations on the Northern Section and the Southern Section of the Tientsin-Pukow Railway shows little sign of settlement. Considerable interest in the question has been manifested in many quarters since the publication in the FAR EASTERN REVIEW of January of an historical and descriptive article on the Tientsin-Pukow Railway, and in our last issue of further statements of an official character. A correspondent writes to us to point out that Ruskin has expressed decided views on the general subject, and encloses the following extract from the " Seven Lamps of Architecture :"—

> Another of the strange and evil tendencies of the present day is to the decoration of the railroad station. Now, if there be any place in the world in which people are deprived of that portion of temper and discretion which is necessary to the contemplation of beauty, it is there. It is the very temple of discomfort, and the only charity that the builder can extend to us is to show us, plainly as may be, how soonest to escape from it. The whole system of railroad travelling is addressed to people, who, being in a hurry, are therefore, for the time being, miserable. No one would travel in that manner who could help it—who had time to go leisurely over hills and between hedges, instead of through tunnels and between banks: at least those who would, have no sense of beauty so acute as that we need consult it at the station. The railroad is in all its relations a matter of earnest business, to be got through as soon as possible. It transmutes a man from a traveller into a living parcel. For the time he has parted with the nobler characteristics of his humanity for the sake of a planetary power of locomotion. Do not ask him to admire anything: You might as well ask the wind. Carry him safely, dismiss him soon: he will thank you for nothing else. All attempts to please him in any other way are mere mockery, and insults to the things by which you endeavour to do so. There never was more flagrant nor impertinent folly than the smallest portion of ornament in anything concerned with railroads or near them. Keep them out of the way, take them through the ugliest country you can find, confess them the miserable things they are, and spend nothing upon them but for safety and speed. Give large salaries to efficient servants, large prices to good manufacturers, large wages to able workmen; let the iron be tough, and the brickwork solid, and the carriages strong. The time is perhaps not distant when these first necessities may not be easily met; and to increase expense in any other direction is madness. Better bury gold in the embankments than put it in ornaments on the stations. Will a single traveller be willing to pay an increased fare on the South-Western, because the columns of the terminus are covered with patterns from Nineveh?—he will only care less for the Ninevite ivories in the British Museum: or on the North-Western, because there are old English looking spandrels to the roof of the station at Crewe?—he will only have less pleasure in their prototypes at Crewe House. Railroad architecture has, or would have, a dignity of its own if it were only left to its work.

We doubt whether this dictum will be accepted as conclusive. It is to be noted that in connection with the new Grand Central Terminal at New York, a writer in the *Scientific American* says that the "motive of its façade is an attempt to offer a tribute to the glory of commerce" (as exemplified in the Grand Central Terminal.) Two eminent firms of architects collaborated in the work of erecting the Terminal; the general æsthetic treatment of the subject being left to one, while the other was entrusted with the "engineer-architect" features. It may, of course, be claimed with justice that there is a very considerable difference between a Terminal in the second largest city of the world and the stations scattered along a railway line in the interior of China. From our point of view it is better that beauty and utility should always be combined, but it is obvious that if it be impossible to secure both, beauty must give way to utility.

CHINA'S RAILWAY RECEIPTS

The statement comparing receipts of various Government railways in China for the past four years, which is published below, affords striking evidence of the extraordinary movement which trade exhibited despite the disturbances caused by the Revolution. Judging from the pessimistic reports which had been circulated there was every reason to believe that trade returns would either disclose stagnation or a backward tendency. The railway receipts, which in most countries may be regarded as a barometer of commerce, show, on the contrary, that not only did the Revolution not financially depress traffic, but that the earnings were increased. Every road except the Chuchow-Pingsiang Railway, chronicled an increase over the average of the three previous years, and the total net increase for the whole system is over $6,500,000.

A comparison of the returns for the years 1909, 1910, and 1911 is interesting. The year 1910 shows a fair increase over 1909, whilst the year 1911 shows a decrease on some of the lines. When it is remembered that traffic on some of the railroads was absolutely suspended for months during the Revolution, this indicates that general business showed not a fluctuation, but what can be described as a steady increase. Such a thing may be due to abnormal conditions favoring railway transportation, but, in the absence of specific statistical returns, it is difficult to make an analysis which will clearly indicate what were the actual causes of the rise. On the Peking-Mukden and the Shanghai-Nanking Railways there was an abnormal movement of people fleeing from various cities along the routes, but any extraordinary increase in that direction would be counteracted by the losses caused by the suspension of traffic on other lines. In fact, on the Peking-Hankow line, no passengers were carried

for some months, whilst regular passenger traffic was interrupted on the Shanghai-Nanking line for some time. Soldiers even yet crowd into trains and refuse to pay their fares, thus obstructing the regular flow of traffic, passengers being afraid to travel for fear of molestation. On some sections of the Peking-Hankow Railway, where up to $3,000 per day was taken, the line is now receiving $300 per day. This at a time of comparative peace. In fact, the loss in this direction conjoined with the dislocation of commercial traffic in some sections during the Revolution, far more than counterbalances any gain made by the receipts due to the extraordinary migration of refugees in the Revolution period.

If a fair allowance is made both for the loss on account of the disturbances, and the gain made through the abnormal movement of people, there should be an equalization, but the returns indicate that the railways increased their business. That increase, of course, may be accounted for in different ways. It may mean that there were good seasons and good general business. Taking all in all, and making a fair deduction, it is safe to say that the returns prove that the economic fabric of the country was not so badly affected by the Revolution as has been declared by many publicists. Happily the country has not suffered as it might have done. The man on the land, it is demonstrated, continued in his business of production, and, except in very limited areas, he was not affected by the conflict of troops which marked the latter part of 1911 and the political storm which prevailed during 1912. Even where the fighting was most severe, recuperation has shown itself in a remarkable way. At Hankow the burned section has almost been reconstructed, not in the manner planned by those who saw in their mind's eye a modern city arising from the ashes of the destroyed hovels, but much on the old lines. The people who had business to do, and who found that there was business to be done, could not wait for the leisurely æsthetics to plan the rebuilding of the desolated area. They went ahead and erected whatever shelter they could contrive in order to enable them to continue the commerce upon which their existence depended.

Although inland cities on the railway were affected by the Revolution, a large movement of cargo took place through them, the railways carrying goods there to be sent into the country to where the population had fled. The real economic loss to China as a result of the Revolution has been almost nil. Some individuals have suffered severely, but in general the country shows greater business than ever in her commercial history. Had the Revolution militated against prosperous continuance of commerce and trade, as has been alleged, there would have been stagnation, if not a tremendous decrease. But a state of things startlingly to the contrary has been shown. Not only have the railways shown substantial increase in earnings, but for 1912 the Maritime Customs—which may be regarded as the pulse of the country in so far as foreign trade is concerned—produced record returns over the previous year, which in themselves proved a record over preceding years.

Another table which we publish below gives a statement comparing the actual receipts with the receipts estimated for the Budget by the Minister of Communications. The estimates were based on the averages and probabilities of former years and the returns therefore exhibit conclusively enough that the increase in the operations of 1912 was a genuine rather than a nominal one.

STATEMENT COMPARING THE RECEIPTS OF THE RAILWAYS UNDER THE DIRECT CONTROL OF THE DEPARTMENT OF COMMUNICATIONS FOR THE YEAR 1912 WITH OTHER YEARS

Name	1909	1910	1911	Average 3 Years	1912	Increase	Decrease
Peking-Mukden . .	$11,804,638	$ 1,316,164	$12,121,391	$11,747,398	$13,000,000	$1,252,602	
Peking-Hankow . .	11,114,614	12,242,858	11,398,460	11,585,311	13,114,302	1,529,591	
Chenting-Taiyuan . .	1,449,806	1,756,493	1,661,975	1,622,758	2,480,000	857,242	
Taokow-Tsinghwa . .	356,517	477,593	466,558	433,556	540,000	106,444	
Kaifeng-Honan. . . .	390,930	555,302	614,846	520,226	795,000	274,774	
Shanghai-Nanking . .	1,796,083	2,018,349	2,251,072	2,021,835	2,660,000	638,165	
Chuchow - Pingsiang (Hunan)	606,148	688,216	425,511	573,292	237,000		$336,292
Peking-Kalgan	476,442	1,329,632	1,486,241	1,097,438	2,412,000	1,314,562	
Canton-Kowloon . . .			231,268		597,800	366,532	
Kirin-Changchun . . .			21,450		213,000	191,550	
Chang-sui Extension (Kalgan line) . .			89,034		401,000	320,966	
					Total	$6,852,428	$336,292
					Net Increase	6,516,136	

STATEMENT COMPARING ACTUAL RECEIPTS WITH BUDGET ESTIMATE OF THE RAILWAYS UNDER DIRECT CONTROL OF THE DEPARTMENT OF COMMUNICATIONS FOR THE FIRST YEAR OF THE REPUBLIC (1912)

Name	Actual Receipts (1912)	Estimated Receipts as shown in Budget	Increase	Decrease
Peking-Mukden - - - - - - -	$13,000,000	$10,635,150	$2,364,850	
Peking-Hankow - - - - - - -	13,114,302	13,051,500	62,802	
Chenting-Taiyuan - - - - - -	2,480,000	1,800,000	680,000	
Taokow-Tsinghwa - - - - - -	540,000	631,621		91,621
Kaifeng-Honanfu - - - - - -	795,000	630,000	165,000	
Shanghai-Nanking - - - - - -	2,660,000	2,347,650	312,350	
Chuchow-Pingsiang (Hunan) - -	237,000	612,811		375,811
Kirin-Changchun - - - - - - -	213,000	15,000	198,000	
Peking-Kalgan - - - - - - -	2,412,000	1,452,000	960,000	
Canton-Kowloon - - - - - - -	597,800	870,000		272,200
Chang-sui Extension (Kalgan) - -	401,000			
	Total - - - - - - -		$4,743,002	$739,632
		Net Increase - -	$4,003,370	

CHINA'S FOREIGN TRADE

The Revolution has caused a change in practically everything appertaining to the national life of China, and it was inevitable that there should be symptoms of some alteration in trade relations between Chinese and foreigners. Certain Chinese have expressed the hope that the foreign middleman will be done away with, and that business in the future will be conducted directly between Chinese merchants in China and foreign concerns in America and Europe. The present system, whereby the Chinese have to deal with agents at the treaty ports, is, they say, burdensome and expensive. This is a plausible argument, but it may be shown without difficulty that the existing system is the best in the circumstances which prevail to-day, and will continue to be the best for many years to come.

There are extremely few Chinese in mercantile life who could efficiently perform the correspondence work which would be entailed in direct trade. It is obvious that a small misunderstanding in regard to a business deal of any magnitude might result in great friction and loss. Moreover, there is the question of credit to be considered. Large American or European firms engaged in the export trade know from experience that their foreign agents at the treaty ports are stable, and they fill their orders with confidence and without demur. The situation would, however, be quite different were Chinese firms to endeavour to do business direct. It would take time to establish the mutual confidence on which so much depends in modern business affairs. Moreover the foreign agent at the treaty port is equipped with a knowledge of both foreign and Chinese conditions, and it has been essential that he should keep in the closest touch with exchange.

Considered from a broad standpoint, the foreign agent in China is found to be a help rather than a hindrance to China's trade. He has personal knowledge of what the Chinese want and he is better able to communicate his knowledge to his principals than could the Chinese. Possibly in the future there will be a development in the direction of closer association between the Chinese and the foreigner in China, and this will be welcomed. But we venture to assert that the time has not yet come for the Chinese to seek to dispense with the services of the foreign firms in the treaty ports, which have done such notable work in extending the sphere of China's foreign trade.

SHIPPING SUBSIDIES

Some opposition has been voiced in Japan against a proposal by the Government to grant an annual subsidy of Yen 413,000 to the Nippon Yusen Kaisha for its steamer service to Australia. The settled policy of the Japanese Government has been to encourage the shipping and ship-building industry to the fullest possible extent. It is not our purpose at the moment to consider the arguments for and against the subsidy system. In this, as is most similar questions, a great deal depends upon the point of view. Powerful arguments can be adduced to prove either that the bracing effect of free competition leads in the long run to better economic health, or that judicious encouragement by Government can carry an infant industry safely past dangers to which it might otherwise succumb.

That the shipping and ship-building industry in Japan has shown a remarkable development is a statistical fact. In 1896 when the Navigation Encouragement Act was promulgated there were 174 steamers of 500 tons and over flying the Japanese flag. In 1908 the number had risen to 477, and whereas in 1896 there was only one vessel of over 5,000 tons, in 1908 there were 32 with a tonnage in excess of that figure. Turning to ship-building, we find that in 1900 the Japanese shipyards turned out 77 steamers with a total tonnage of 12,828, while in 1908, the total was 137 and the tonnage 246,764. The great shipyards, the Mitsu Bishi and the Kawasaki are magnificently equipped and can turn out liners of over 10,000 tons. Whether the striking advance shown by these figures and facts is to be attributed to the subsidy system we leave for those directly interested to decide.

Apparently the opposition to the subsidy to the Nippon Yusen Kaisha is not based upon objection to the subsidy system *per se*. Mr. Fukuzawa Momosuke, a member of the Japanese Parliament who has been most prominent in the agitation against the subsidy, relies upon the assertion that the Nippon Yusen Kaisha is now rich enough to do without so much State assistance. He points out that the Company's profits for the last three years, after deducting all expenses, depreciation, insurance, etc., have been as follows:—

	Profit. (Including Sudsidy.)	Amount of Subsidy.
1910—		
First Half	Y3,703,391	Y3,188,911
Second „	4,298,741	2,940,966
1911—		
First Half	4,061,963	2,893,248
Second „	4,600,678	2,931,968
1912—		
First Half	4,116,640	2,621,955
Second „	4,944,289	2,465,841

The figures quoted are certainly striking, but it is doubtful whether the Japanese Diet will reverse its policy in respect to subsidies. Although the finances of the country certainly have to meet a serious strain at present, the policy of commercial expansion has been recognized as essential to Japan's continued progress as a Great Power, and it seems improbable that retrenchment will take the form of curtailing the encouragement given to the Japanese mercantile marine.

J. G. WHITE & COMPANY, INC.

Messrs. J. G. White & Co., Inc., of 43-49 Exchange Place, New York, has issued a most attractively got-up "Announcement" informing the public of the separate incorporation of its principal departments. This well-known company has come to the conclusion that the immense development of its operations has called for a separate incorporation and independent management of its three major departments, and, as a result of that decision, subsidiary companies have been formed. These are "The J. G. White Engineering Corporation" and "The J. G. White Management Corporation." It is believed that this specialization will widen the influence and increase the general efficiency of the work of J. G. White & Co, Inc. The parent company continues as an active financing and owning company in the general field of engineering and public utility enterprise.

The new companies begin their operations thoroughly equipped to undertake the most important and extensive engineering and management work. They inherit, not only the physical equipment and departmental organizations of J G. White & Co., Inc., but also the experience and reputation of the J. G. White companies in the United States, Canada, Great Britain, South and Central America, Australia, India and other parts of the world. It is believed with reason that this policy of placing on an independent working basis the three divisions, Finance, Engineering-Construction and Management—will lead to a decided increase in efficiency.

We congratulate Messrs. J. G. White & Co., Inc., upon this important departure, and we feel convinced that the prestige that attaches to the parent company will be maintained by the offspring. Success is the more assured by the personality of the Directorates of the subsidiary companies which are as follow:—

The J. G. White Engineering Corporation

Harry Bronner, Hallgarten & Company
F. Q. Brown, Redmond & Company.
James Brown, Brown Brothers & Company.
Douglas Campbell, Campbell, Harding & Pratt.
George C. Clark, Jr., Clark, Dodge & Company.
Bayard Dominick, Jr., Dominick & Dominick.
Anton G. Hodenpyl, Hodenpyl, Hardy & Company.
G. Humann Kinnicut, Kissel, Kinnicut & Company.
Augustus F. Kountze, Kountze Brothers.
Thomas W. Lamont, J. P. Morgan & Company.
Arthur H. Lockett, Pomroy Brothers.
Marion McMillin, Emerson McMillin & Company.
J. H. Pardee, President, The J. G. White Management Corporation.
Eliphalet N. Potter, Potter, Choate & Prentice.
Frederic H. Reed, Vice-President, J. G. White & Co., Inc.
Charles H. Sabin, Vice-President, Guaranty Trust Company of New York.
Albert Strauss, J. & W. Seligman & Company.
Moses & Taylor, Kean, Taylor & Company.
George H. Walbridge, Wm. P. Bonbright & Company, Inc.
J. G. White, Chairman, Finance Committee.
Gano Dunn, President.
Elgl Williams, Viee-President.
Albert S. Crane, Vice-President.
Henry A. Lardner, Vice-President, San Francisco.
E. N. Chilson, Manager Purchases.
C. E. Bailey, Manager Engineering Reports.

The J. G. White Management Corporation

Cecil Barret, Spencer Trask & Company.
J. C. Bishop, Redmond & Company.
P. M. Chandler, Chandler Brothers & Company.
Arthur Coppell, Maitland, Coppell & Company.
Gano Dunn, President, The J. G. White Engineering Corporation.
George E. Hardy, Hodenpyl, Hardy & Company.
R. Grosvenor Hutchins, Jr., Vice-President, National Bank of Commerce in New York.
A. Ludlow Kramer, Vice-President, Equitable Trust Company of New York.
B. L. Montgomery, Montgomery, Clothier & Tyler.
Henry Parsons, Capitalist.
John T. Pratt, Campbell, Harding & Pratt.
Albert Strauss, J. & W. Seligman & Company.
Richard Sutro, Sutro Brothers & Company.
H. R. Tobey, N. W. Halsey & Company.
J. D. White, Secretary, Engineering Securities Corporation.
J. G. White, Chairman, Finance Committee.
J. H. Pardee, President.
Frederic H. Reed, Vice-President.
S. L. Selden, Vice-President.

IRRIGATION IN SIAM

The great Siamese irrigation scheme—the Anthong Dam—which has been sanctioned by the King, provides for the building of a dam at Anthong, so that the water will flow into two canals on each bank. These will form arteries from which the whole system of irrigation will be fed. This will not be a mere canal system but one whereby the water will actually overflow, thus making the present waste and high lands fit for cultivation, and supply cultivated lands in time of drought, irrespective of rainfall.

The actual construction work will begin, it is hoped, in the year R. S. 134, as the intervening period will be fully occupied with the necessary observations and surveys. These will have to be made during a wet season and a dry season, so that by the years R. S. 132 and R. S. 134 (beginning April next), this observation and survey work will be completed and the plans of scheme drawn up. With this purpose in view the preliminary measures will begin at once in the next month or two.

The probable expenditure on the scheme will be in the neighborhood of two or three million pounds sterling. A loan will be negotiated for the purpose, but whether this loan will be one solely for the irrigation scheme or one combined with the Northern Railway loan (Chiengmai extension) is yet uncertain.

U. S. RAILWAY BUSINESS IN 1912

During a period of expanding business profits at first usually rise more rapidly than expenses. That this has not been the case with the railways of the United States during the recent high tide of traffic is shown by their returns for the calendar year 1912. The total operating revenues are their total receipts from freight and passenger traffic, from carrying mail and express and from miscellaneous sources. Operating income is the amount which after all expenses have been paid remains for rentals, interest on bonds, appropriations for betterments, improvements, new construction and for dividends.

The total receipts of the railways of the East were $1,511 per mile higher than for 1911, but operating income gained only $240. The total receipts of the railways of the South increased $492 a mile for the year, but operating income suffered a loss of $109. The railways in the West gained $226 per mile in operating income, which offset the loss of approximately the same amount in the previous year. If the closing six months of 1912 be alone considered the situation was not so unfavorable, but even for this period of mounting traffic the increase in expenses outran the increase in receipts.

That the funds available for developing and extending the railways have not kept pace with the growth in traffic or the increased expenses of operation is shown by the following percentages. For the railways of the East the total operating revenues increased 7.2 per cent., operating expenses 8.3 per cent., and taxes 8 per cent., leaving an increase in operating income of 4.3 per cent. For the railways of the South total operating revenues increased 4.9 per cent., operating expenses 8.4 per cent., and taxes 2.8 per cent., leaving a decrease in operating income of 4 per cent. The unusual traffic of the West enabled the railways of that section to obtain an increase of 8.4 per cent., in operating income, which just about balances the losses sustained during 1911.

The foregoing figures are all upon the mile of line basis and were compiled by the Bureau of Railway Economics from the reports made to the Interstate Commerce Commission by the railways having total annual operating revenues of one million dollars or over. These include about ninety per cent. of the steam railway mileage of the United States.

MR. WEN TSUNG-YAO

The Chinese Government is desirous of coming to some settlement with the British Government in regard to Tibet, and as a first step in this direction propose the appointment of Mr. Wen Tsung-yao as special envoy to London to negotiate on their behalf. In selecting Mr. Wen Tsung-yao for this important post the Chinese Government show considerable wisdom, for perhaps no other official is in the unique position which Mr. Wen occupies to conduct this delicate work. While in Tibet as Junior Amban Mr. Wen won the respect of the Tibetans and of the British officers with whom he came into contact, and apart from that possessed himself of an understanding of the situation which will be invaluable at this juncture.

So far, the British Government has not signified its intentions with regard to the suggestion of China, though there is a probability that an effort will be made to have negotiations conducted in Peking. Great Britain cannot refuse to negotiate, notwithstanding the terms of the reply by China to the British note[1] of August last, but no doubt an effort will be made to limit China's range.

MR. WEN TSUNG-YAO

The career of Mr. Wen Tsung-yao has been an extremely interesting one. He has been in the political or official arena for over eleven years, and is a deep student of foreign politics. His leaning is towards British history, and he has a familiarity with the lives of the foremost statesmen and the record of the Mother of Parliaments which enables him to non-plus more than the average of erudite Britons in argument. But Mr. Wen was a born diplomat. In days long antedating his schooling, when he was a very small member of the child kingdom of his village near Canton, it was his habit, with others, to ride buffaloes to the hills to feed. One day a group of kindred spirits derived satisfaction from seeing their buffaloes eating the pea-nut crop of a rival clan, and their enjoyment was only disturbed when they saw men of the clan rushing out to wreak vengeance. All but Wen managed to escape. He was too small to get upon his buffalo unaided, and realising that woe would be his unless he could divert the anger of the mad peasants rushing upon him, he assumed an innocence foreign to his feelings. Without ado the angry farmers seized him and his buffalo, and were threatening dire vengeance. They held him throughout the day, and only when his own village had rallied and despatched all the men capable of bearing arms to descend upon his captors did he turn up. His would-be rescuers met him riding through the fields, contentedly perched upon his cow. They expected to find him dead, or badly mauled. They questioned him closely as to how he escaped. "Oh," blandly said the diminutive diplomat, "when they rushed at me in anger and accused me of letting my buffalo eat their crop, I laughed at them. 'There are the ones who ate your peanuts—fleeing over the hills,' I said. 'Do you think I would stop here if my buffalo had been eating your crop? No, I would have fled with the others!'" The reason in his argument told, and the angry farmers, who would have skinned him alive, and his buffalo, too, had they not believed him, had to be content to view their torn pea-nut field, and plan some method of getting satisfaction from the others.

Mr. Wen drifted from his *alma mater*—Queen's College, Hongkong—to Tientsin University, where he engaged in teaching until he was given a post as Foreign Secretary to the Customs Taotai. After that he was secretary to the Chinese Commissioners in the negotiation of the Mackay Treaty, and from 1903 to 1908 was Director of Foreign Affairs at Canton, a Director of the Canton-Hankow Railway, the telegraph administration of the Two Kwang provinces, and the telephone system of Canton.

In 1908 he was appointed to Tibet as Junior Amban and remained there for two years, being the second Chinese ever to have held the post. His departure was due to the turmoil which ended in the flight of the Dalai Lama to India, and he came back to China to assume duties as adviser to the Viceroy of Nanking, which position he held until the Revolution[2] came. Ever a strong opponent of absolutism he joined the

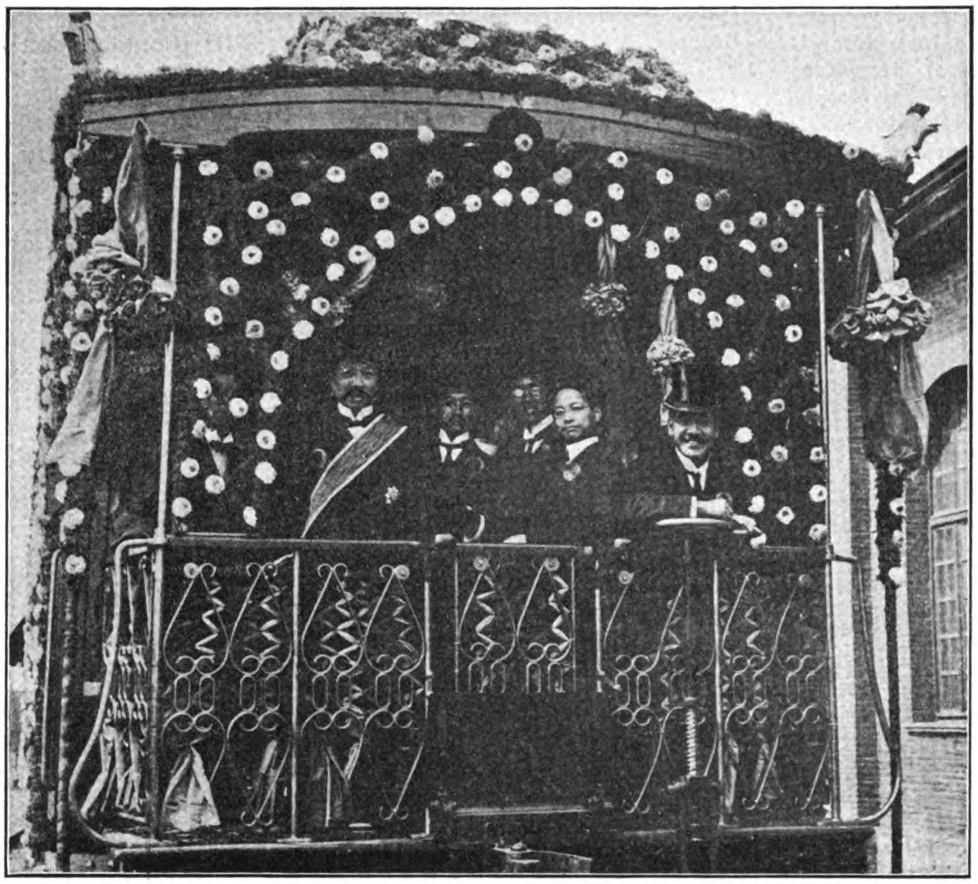
[1] Published in the FAR EASTERN REVIEW of January last.

[2] The Revolution was fully described in the FAR EASTERN REVIEW of April, 1912.

revolutionary ranks and quickly proved himself to be one of the ablest and most out-spoken members of his party. He was made Vice-Minister of Foreign Affairs at the outset, and later assistant Peace Commissioner to Dr. Wu Ting-fang. To the activities of Mr. Wen is due much of the success of the revolutionary party in check-mating the Manchus in their efforts to raise loans for the campaign, and his force of character in other directions had a determining influence upon the happenings of the time. As assistant Peace Commissioner his personality was dominant in the negotiations, and it is questionable if events would have shaped as they did do had it not been for his inflexible courage in and out of the peace conferences. Ultimately he was appointed Commissioner of Trade and Foreign Affairs at Shanghai, and head of the Prize Court.

Resigning as Commissioner for Foreign Affairs in March, 1912, Mr. Wen devoted himself to the reformation of the China Merchants' Company. As a director he exerted an influence which stirred the old organisation to the bottom and caused such a pother in the ranks of the corruptionists that he had to make a vigorous and sustained fight to gain a victory over them. How he resisted the forceful endeavours of the employees to secure an unwarranted bonus was told in a recent issue of the FAR EASTERN REVIEW, and that episode alone showed him to be a man of unusual strength of character.

Mr. Wen was born in 1867, so is now in the prime of life. He is the author of "English Grammar Simplified," designed to assist the Chinese student to a rapid acquirement of a knowledge of the application of the rules governing English speech and literature, and has another book on English composition on the stocks.



FUNERAL OF THE EMPRESS DOWAGER.—THE FUNERAL CAR.
READING FROM LEFT TO RIGHT:—
MR. CHU CHI-CHIEN (MINISTER OF POSTS AND COMMUNICATIONS)
MR. TSENG KUANG-HSIANG (INSPECTOR-GENERAL OF RAILWAYS.)
MR. KWANG (DIRECTOR OF THE PEKING-HANKOW RAILWAY)
MR. YI KUNG-CHO (DIRECTOR-GENERAL OF RAILWAYS.)
MR. KUAN MIEN CHUN (DIRECTOR OF THE PEKING-KALGAN RAILWAY)
Specially taken for the Far Eastern Review.

UNIFYING RAILWAY ACCOUNTS

The article by Dr. C. C. Wang on "The Necessity for Unification of Railway Accounts in China," which we publish elsewhere, is a timely proof of the new spirit animating thoughtful Chinese. The disappointment of over-extravagant hopes on the part of some foreigners, who expected China to make greater progress in one year than any nation could be fairly expected to make in ten, has caused a backswing of the pendulum of enthusiasm and there is an increasing disposition in some quarters to brand New China as an abject failure. The thoughtful and valuable article by Dr. Wang comes as a reminder that there are Chinese gentlemen and scholars who are avoiding the political limelight and giving much-needed attention to problems of administration, the solution of which will tend indirectly to render the political atmosphere clearer. Again and again has it been pointed out that the art of public accountancy is almost unknown in China, and readers of Mr. H. B. Morse's excellent book "The Trade and Administration of the Chinese Empire" will recall that he showed that what accounts were kept as between the Central and Provincial Governments appeared to be designed rather to obscure than to illuminate the financial position. That a realization of the importance of a uniform system of accountancy in connection with railways is developing in China must be hailed as a most hopeful sign.

As Dr. Wang suggests, the reform will take time. It will not be easy to persuade those who have devised their own system that it is inferior to a new one. Without attributing venal considerations, a system of keeping accounts that reflects the most favourable light upon those interested in the management of a line, is bound to commend itself to them, and it is to be anticipated that there will be a certain amount of opposition to unification. However, it is so obvious that the system will tend to improvement, ramifying in various directions, that its adoption is certain.

Without wishing to indulge in prophecy, the opinion may be hazarded that the railways of China will soon be her greatest asset. It has been said that if a railway were to start in China from no particular place and to end in a locality as indefinite, it would rapidly develop a lucrative carrying trade. There is more than a germ of truth in this picturesque assertion. China's railways under efficient management are rapidly becoming one of her most promising sources of revenue. When the operations contemplated by the Chinese National Railway Corporation, of which Dr. Sun Yat-sen is Director-General, are begun the importance of the lines as revenue producers will be materially enhanced. In view of this certain development it is highly gratifying to find that such important questions as securing uniformity in railway accounts are being given the attention that they deserve.

MINING IN CHINA

PROGRESSIVE MOVEMENT BY THE MINISTRY OF MINES

It is well known to the world that the mineral deposits in the vast country of China are incredibly rich, while development work has been incredibly poor. Owing to superstitious beliefs mining enterprise was rigidly prohibited during the twenty-four Dynasties preceding that of the Ch'ings, a period extending over four thousand years. Even in the Ch'ing Dynasty, the prohibition was raised only within very recent times, when mining affairs were placed under

the supervision of the Board of Agriculture and Industry. Not till then was anything like a beginning made seriously to develop this enterprise, but even now it is no exaggeration to say that the immense mineral resources of the country have scarcely been touched.

It would be difficult to imagine what enormous wealth China could acquire if she set her mind determinedly to the task of reaping the benefits derivable from a systematic exploitation of her latent mineral resources. That there is a movement afoot we are pleased to chronicle. The Ministry of Industry and Commerce is now giving the matter serious attention. Considerable activity has, in fact, already been displayed to start a great mining propaganda, aiming at developing the resources of the whole country.

Properly to direct this gigantic task, three organizations will soon be formed, namely, the Mining Academy, the Prospecting Corps, and the National Mining Association.

In the past mining education has not been prominently sought after nor encouraged and very few students have specialized in this subject. There is a Geological Department in the Peking University, but since its inauguration, only three students have graduated from it.

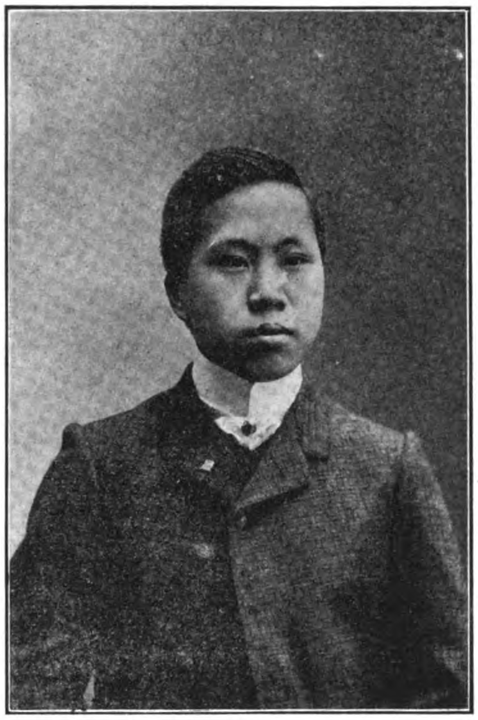
To give stimulus to this branch it is proposed to establish a Mining Academy, which is to be attached to the Mining Department of the Ministry of Industry and Commerce. It will take students who have passed the Middle School course, and, after three years' rigid training, in addition to class-room work, they will be sent out to make actual experiments.

The Geology Department of the Peking University will co-operate with this Academy in the training of these students. The Academy will have one President and four professors, two of whom are to be foreigners and two Chinese. The unique feature is that the professors are to teach for half the year and to spend the other half in active prospecting. An abundant collection of books, and mineral specimens have been procured.

At the start, thirty students will be taken, and they are to be divided into two classes, the Mining Class and the Geology Class. Graduates from this Academy are to have conferred upon them the degree of M.E., and will be entitled to join the Prospecting Corps. If the graduate acquits himself well, and renders efficient service for three years in this capacity, he will be appointed a Technical Expert.

The President and four Professors of the Mining Academy are to form the heads of the Prospecting Corps. The object of this Corps is to instruct graduates in actual field work. They are to prospect in the various provinces, make reports and formulate plans for developing mines. Such reports and plans are to be submitted to the Chief of the Mining Department of the Ministry and the Minister for consideration. When the arrangement is working there will always be two professors in the Academy and two professors in the field. Thus the Prospecting Corps will be closely related to the Academy. The Prospectors are to make extensive travels and prospect in important mining districts; in doing this they will familiarise themselves with the geology of their own country and the characteristics of its minerals. It is recognised that the class-room work is not calculated to increase either the professors' knowledge or experience, and mere theorizing without actual demonstration is not likely to make the graduates efficient engineers.

We give below a translation of the pamphlet issued by the Ministry of Industry and Commerce in regard to the institution of the Mining Academy and the Prospecting Corps.



MR. KOUS CHANG, DIRECTOR OF THE MINING DEPARTMENT OF THE BOARD OF INDUSTRY AND COMMERCE

"At the present juncture China is experiencing acute financial distress. It is a puzzle how this vast country, with almost inexhaustible resources, can be poverty-stricken; yet poverty-stricken it is, at least for the present moment. But we all realize that China will be well-off if she will only take the trouble to convert the minerals underneath the earth into useful materials.

"During the past few years many persons have been urging the importance of opening and developing mines, and not a few capitalists have actually engaged in mining enterprises. Considerable time has now elapsed and much money and energy have been expended, but not much success has attended the endeavours, and we usually ascribe that to the following causes:—lack of adequate capital; difficulties in communications and lack of proper men to manage the work. These causes are indeed enough to obstruct the progress of any enterprise, but let us imagine that all these defects are removed, what else is wanting? Most emphatically there is need of thorough investigation before any development work is attempted. This is more important in our country in view of the scarcity of capital to carry out the work. When we are confronted with the problem of carrying out unlimited enterprises with limited capital, we will have to solve it by devoting the capital to only the most profitable sections. The hardest part is to ascertain which are the most important and profitable, and which are not. The Prospecting Corps will be formed with the solution of this problem in view.

"According to the present status in our country, private capital will not be sufficient to cope with such big issues, and much must be derived from the Government. If the Treasury is not able to meet this expenditure, the Government will have to float foreign loans. But the proceeds from loans will be necessarily limited, and will not be able to meet the demands of every province. The Government cannot refuse money to one province and grant it to another province for mining enterprise unless there is very good ground for doing so. For instance, there are kerosene wells in both Szechuan and Shensi. The Szechuan men will insist on having money granted to Szechuan to develop the wells, and the Shensi men will be sure to claim that the money should be granted to them to develop their wells. Now, since the funds are limited, we must do one thing at a time. We cannot afford to divide the money among them, and therefore there must be some standard by which to judge the province which deserves first attention. The function of the Prospecting Corps will be to review the various degrees of importance of different districts.

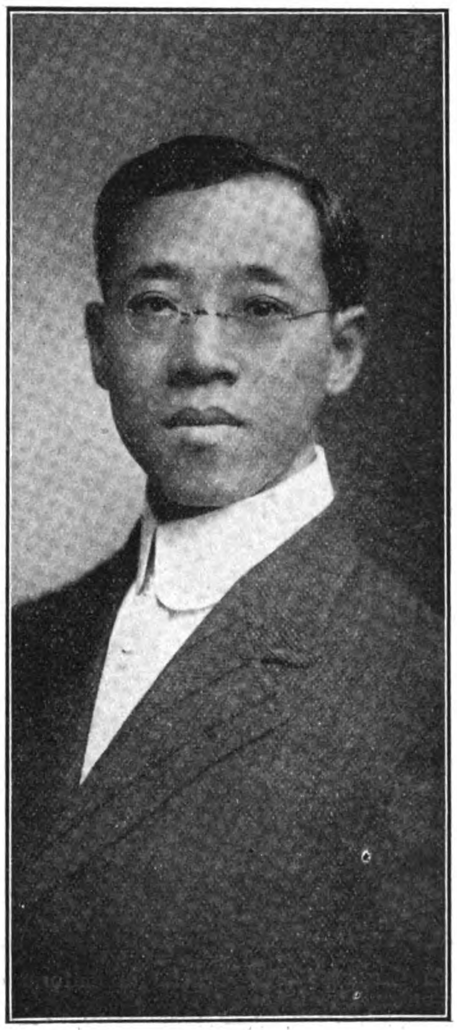
"There is another great obstacle in the way of healthful development of mining enterprises. We know only too well the disasters that befell the financial market when ruthless speculation and "bubble" exploitation was attempted in connection with mining enterprises in Australia and other countries. Australia is one of the richest of the gold producing countries, and it is a common saying among Australians that the gold output of Australia in the recent fifty years is enough to be moulded into a Triumph Arch, but the capital that was needed to procure this gold is enough to be melted into two such arches. Now in a country like ours, heartless exploiters will have a splendid chance to reap fortunes by representing the merits of non-existing mines, and the ignorant mass will be easily deceived. It is well to be on guard at the outset to prevent swindling schemes such as those that have shaken

the financial situation of foreign countries in the past, and it is the duty of the Government of keep a strict surveillance and afford protection to the mass of the people. The Prospecting Corps will render great service in this respect for it will endeavour to make accurate reports and reliable estimates of mineral deposits, and, when this is accomplished, any mining swindle may be easily exposed.

"This Prospecting Corps will not stop with simply collecting and studying books and specimens. The Corps will actually go into the mining districts with picks and shovels. They will make surveys, draw maps, and bring back specimens of the minerals they dig up from the ground.

"Now all this is a great undertaking when we bear in mind the vastness of the territory. When we study the records of the European Geological Investigation Bureaux, we find that one man would cover a distance of 6,000 *li*, or 2,000 miles in a year, and he is able to survey in one year about 1,000 *li*. As yet we do not have very accurate maps of our country. We will first take China proper, which is about 15,000,000 square *li*. If the period required to cover the whole country is fixed at 10 years, then it will require 1,500 prospectors, and the minimum salary for this corps will be Tls. 3,000,000, without counting the travelling expenses, cost of apparatus, etc. The European countries make very thorough investigations and surveys, and they are able to draw maps to a very large scale. Therefore they take a long time in accomplishing the work.

"We will proceed with this work in this way. Divide the mining districts of the whole country into three classes. Those districts where there are rich mineral deposits and easy of development will be placed under Class 1. Those districts where there are easy means of communication and offer good advantages, will be called Class 2. Those where communication is difficult and with little value shall be under Class 3. In districts under Class 1, we will make very thorough investigations and draw maps of 1 ; 20,000. For Class 2 the investigations will be more general, and the maps will be on a scale of 1 ; 100,000. A brief survey and investigation will be made in districts under Class 3, and the map will be only 1 ; 250,000. We estimate that there are only one-tenth of the mining districts in this country entitled to belong to Class 1 ; three-tenths may belong to Class 2, while six-tenths of the whole may come under Class 3. We will fix the period at fifteen years. The first three years will be the trial period, and after the third year, the number of prospectors will be increased, maps will be made, and specimens will be collected. In fifteen years, the general conditions of mining in this country will be fairly established. This work will form the basis of the proper development of the nation's resources, etc."



MR. LIU CHIEN (CHIN YIN RICHARD LIU) B.A., M.E., TECHNICAL EXPERT OF THE MINING BOARD

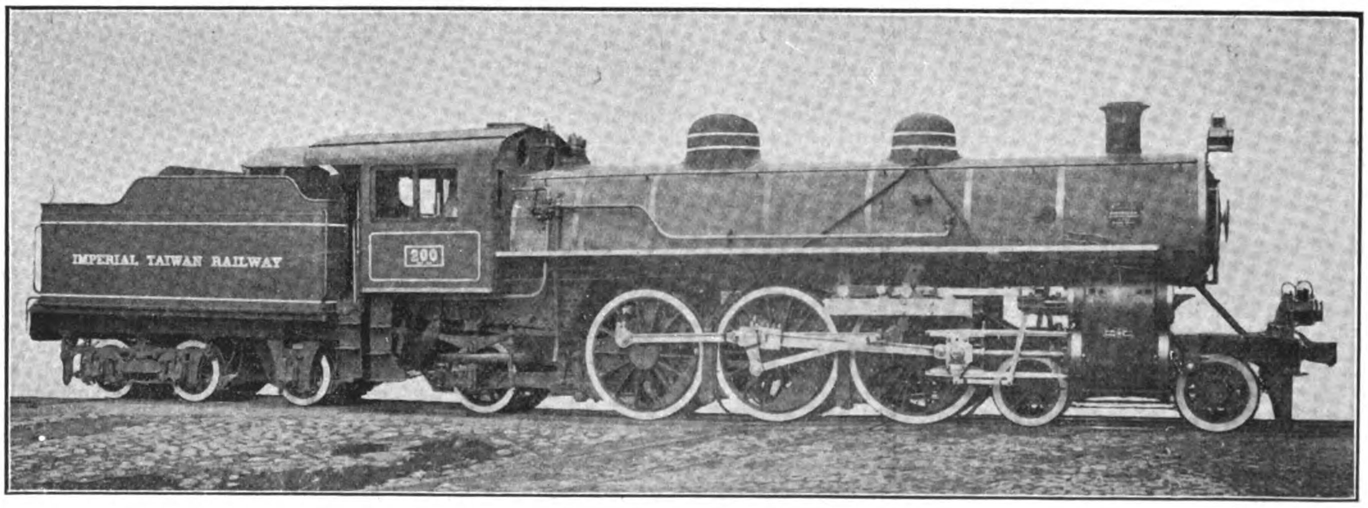
From the above declaration it will be noted that the Government have thoroughly awakened to the importance of developing mining enterprises, and the formation of the Mining Academy and the Prospecting Corps are the first conscientious efforts.

In addition to the Academy and the Corps, there is also being formed a National Mining Association. The members of this Association will be drawn from the proprietors of Mining Companies, those who are engaged in mining work, returned students with the M.E. degree, and capitalists and other parties who are in close connection with mining enterprises.

This Association will promote and encourage the carrying out of mining projects, and it will be the organ of the nation's mining section. It will shape the opinion of the country in mining matters, and act as adviser to the Government. All measures of improvement will be actively discussed. It will also institute a special Bureau of Investigation and Compilation, to investigate mining conditions in this and other countries, and issue monographs on important topics.

A Chemical Analysis Laboratory will be attached to the Association, to undertake all analysis work in connection with mining projects. This Association will also publish a Mining Magazine, and translate or compile practical mining books. Another feature of the Association will be a Recommending Bureau, to recommend capable mining engineers to mining projectors and companies.

With the Association on such a large basis and scope, it should exert great influence upon the rapid development of mining projects. The Academy and the Prospecting Corps will make experiments and discoveries, while the National Mining Association will find means to put the plans into actual shape.



ONE OF THE LOCOMOTIVES RECENTLY SUPPLIED BY THE AMERICAN LOCOMOTIVE COMPANY FOR THE IMPERIAL TAIWAN RAILWAYS. THE DRIVING WHEEL DIAMETER IS 63 INCHES; WEIGHT OF ENGINE 136,500 POUNDS; MAXIMUM TRACTIVE POWER 19,900 POUNDS; BOILER PRESSURE 180 POUNDS

DR. SUN YAT SEN'S RAILWAY SCHEME

On September 9, 1912, President Yuan Shih-kai issued a Mandate authorising Dr. Sun Yat-sen to devise means to plan and construct the future trunk railways of China, and in March that authority was endorsed by the National Council, who unanimously passed a Charter giving certain definite powers. On March 31 that Charter was promulgated by President Yuan Shih-kai, and now is therefore, law.

Whilst Dr. Sun has devoted the bulk of his time since his retirement from the Presidency of the Republic to the development of his ideas in connection with a railway system, nothing conclusive has yet been made public, for the reason that so gigantic a matter cannot be settled offhand in so short a period.

Efforts are being made to persuade certain provincial companies to agree to a nationalisation of the lines in their control, and steps are being taken to draft a national railway law which will define the relation between the provinces and the Government with regard to railway construction and control. When matters of this sort are settled or disposed of it will be possible to launch an extensive scheme of construction, providing of course, that the capital is raised. The people are more anxious than ever now to have railway communication, and more schemes are in the air than have ever yet been broached in the last decade. In time most of these will materialise, and when the political unrest which now prevails is settled a serious forward move in construction work can be expected.

MANDATE OF THE PROVISIONAL PRESIDENT

The Advisory Council having passed the By Laws of the Chinese National Railway Corporation of the Republic of China, I, The President, in accordance with Statute No. 30 hereby promulgate the same.

Seal of the President.

Date March 31st, 1913.

Countersignatures { Premier Chao Ping-chun. Minister of Communications, Chu Ch'i-ch'ien.

Charter of the Chinese National Railway Corporation of the Republic of China.

1. The Chinese National Railway Corporation is organised in conformity with the Presidential mandate dated September 9th, 1912. With the exception of finished or unfinished lines under Government management or for which contracts have been signed, or for the building of which provision has been made in preliminary agreements on record, all of which come under the category of lines to be carried out under the direct management of the Ministry of Communications, and lines for which other Companies have secured the franchise from the Government and which should be left in the hands of those Companies, the Chinese National Railway Corporation shall have full powers to undertake to provide for and manage all the trunk lines of China. But when trunk lines are projected the Government must be consulted and its assent thereto obtained.

2. The Chinese National Railway Corporation in addition to all rights and privileges enjoyed by corporations in general under the laws has the following special rights:—

a. The right to project the lines specified in Clause 1.
b. The rights to undertake Chinese and/or foreign loans for the lines specified in Clause 1.
c. The right to exercise control over the management of the lines specified in Clause 1.
d. The right, in addition, to manage all important industries belonging to the lines specified in Clause 1.
e. The right to manage all matters connected with the acquisition of Government land or the purchase of private land required for building the lines specified in Clause 1.

3. In the case of lines not belonging to those specified in Clause 1. should the Government or the original concessionaire be willing to give them over to the Chinese National Railway Corporation to be carried out the Chinese National Railway Corporation may undertake the same.

FUNERAL OF THE DOWAGER EMPRESS:—The General in uniform on the extreme left is GENERAL KIANG CHAO-CHUNG: 1.—THE GUARDIAN OF THE EMPEROR, SHIH-HSU. 2.—PRINCE PU LUN. 3.—CHING KUNG, A MEMBER OF THE IMPERIAL HOUSEHOLD. 4.—DIRECTOR KWAN, OF THE PEKING-HANKOW RAILWAY. 5.—DIRECTOR GENERAL OF RAILWAYS, MR. YI KUNG-CHO. 6.—INSPECTOR-GENERAL OF RAILWAYS, MR. TSENG KUANG-HSIANG.

(This photo was taken specially for the Far Eastern Review when the party photographed went to the Kin-han railway station to inspect the funeral car on March 30.)

Lines other than those specified in Clause 1 may be undertaken by other companies in accordance with the regulations laid down by the Government, but such lines shall not be prejudicial to the interests of the lines undertaken by the Chinese National Railway Corporation.

4. In the case of lines built by the Chinese National Railway Corporation the date of commencement of work, the date of their completion and date of opening for traffic should be reported to the Government for registration at the time their construction is decided upon, and in the event of the work being delayed beyond the specified date the Government has the right to take other means to put the work in hand unless the delay in carrying out the matter was the result of unavoidable causes and that permission to extend the time was obtained in advance from the Government.

In the case of lines under the Chinese National Railway Corporation which in the opinion of the Government are essential for defence or military purposes and which should therefore be built first the Government may set a period and command the Corporation to carry out the matter within the said period and in the event of the Corporation not being able to carry out the matter within the period set the Government may proceed as in the last section.

5. The Government shall do its utmost to afford protection and assistance to all the lines undertaken by the Chinese National Railway Corporation.

6. All the lines undertaken by the Chinese National Railway Corporation should eventually revert to Government ownership. As regards the time limit for the Chinese National Railway Corporation management and the method of taking over by the Government, etc., the Chinese National Railway Corporation should observe the provisions governing commercial Companies in general.

As regards present and prospective laws relating to Railways and cognate affairs with the exception of such special provisions as are herein set forth, the Corporation shall strictly observe the same.

7. The Chinese National Railway Corporation when making loans or raising capital by shares, no matter whether they be Chinese or foreign, shall obey the laws of the State and shall enjoy the benefits secured by the laws of the State. As regards loans which must be guaranteed by the Government the proposed contracts should be reported to the Government for approval. As regards regulations for share capital, if shares by foreigners are concerned, the Government shall be notified for its decision.

No matter what manner of persons may invest capital in the Chinese National Railway Corporation the Government recognises only the Corporation direct.

8. Whenever the Government deems that military requirements necessitate the taking over the Corporation's lines or its exercise of preferential rights therein or when needed for ordinary transport of troops, or police, stores, emigrants, relief purposes, mails, etc., the matter of reductions in rates or free passes shall be arranged in accordance with the rules governing ordinary merchant railway companies.

9. All regulations governing rates of the Chinese National Railway Corporation lines shall be reported to the Government for registration and the Government may exercise the right to fix the maximum and minimum freight rates.

10. The Chinese National Railway Corporation shall not be transferred as a whole to another company and in case any portion of its rights be transferred the Government sanction shall be obtained.

11. The Chinese National Railway Corporation may draw up various regulations based upon these By Laws but they must be reported for registration to the Government.

12. In the event of these laws being found to contain serious drawbacks the Government in consultation with the Chinese National Railway Corporation may amend the same or the Chinese National Railway Corporation may request the Government to frame a motion to this end and such amendment or amendments be made after the National Assembly has voted upon it.

13. These By Laws shall have effect from the date of their promulgation.

THE NECESSITY FOR UNIFICATION OF RAILWAY ACCOUNTS IN CHINA

[By C. C. Wang]

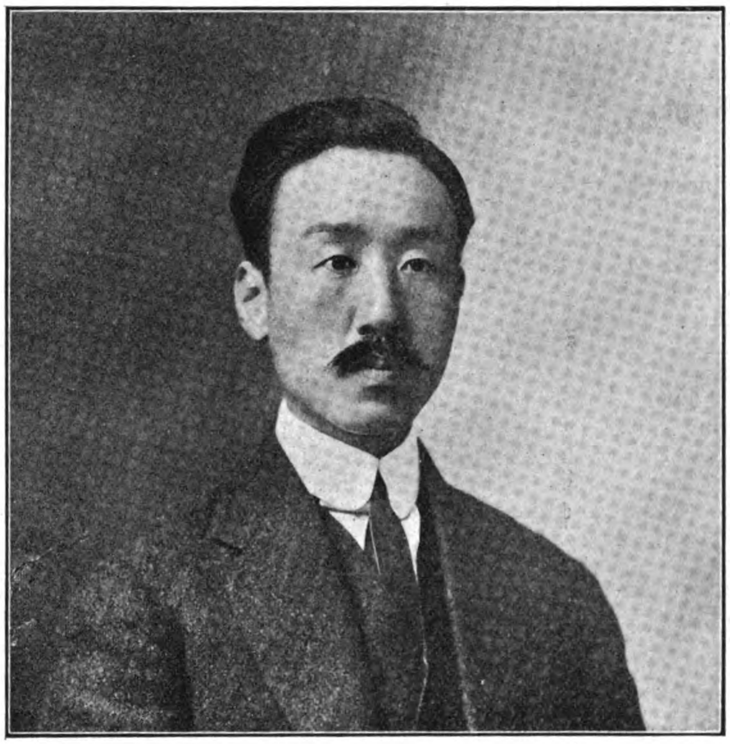
One of the most important branches of railway administration and that branch which has received the least attention in China is railway accounting. About a year ago, when the writer was instructed by the Ministry of Communications to co-operate with other authorities to take over the affairs of the Railway Department from the authorities of the late Ching Dynasty, he was greatly struck by the lack of system and uniformity of the accounts rendered by the different railways under its control. In fact some of the accounts were but cash books of a most elementary nature. They could hardly be called accounts at all from the railway point of view. Moreover, each line had its own kind of accounting, and rendered its accounts in its own way. The accounts of each road not only were different from those of other roads but sometimes changed from year to year. Worse still, there was and is much useless duplication. Oftentimes one finds a complete set of accounts in the Chinese language, rendered in the old-fashioned manner, accompanied byan other complete set of the same thing in some foreign language, such as English, French, German, or Japanese. When we recall that all these railways are directly responsible to, and under the immediate control of, one authority, we cannot but be astonished by the striking lack of uniformity in the accounts.

Under such circumstances, the multifarious nature of railway business renders an efficient control of the different lines extremely difficult, and makes an intelligent judgment of the management of the various railways impossible. It is well known that it is misleading to judge the management of a railroad simply by the revenue of a certain year or even that of a number of years, without a clear knowledge as to how and from what source that revenue comes, and how the property is worked and kept up.

The usefulness of railway accounts and statistics is not limited simply to the showing of the incomes and expenditures. It is to furnish an intelligent comparison of the results of one road with those of the other roads so as to help each to learn from the experience of the others. It also assists the managers to compare the results of their own lines from year to year so as to benefit from experience.

Under the existing circumstances, however, such comparisons are out of the question. What is worse, it seems, is the fact that "dressing" or "cooking" of accounts is not only easy, but in some cases tempting. Once such an evil practice is committed great difficulty will be experienced in discovering it, for to make an effectual airing of railway matters by fathoming into the depth and traversing the labyrinth of the existing systems of accounts is well-nigh impossible, even with expert auditors. As a result, the only use which is made of the reports or accounts now rendered to the Ministry by the various railways seems to be to give employment to a certain number of clerks to compile them for the purpose of decorating the empty shelves of the Ministry.

But this disorderly state of affairs in railway accounting is not unusual, nor peculiar to China. The history of the railway administration of the world shows that the same or similar troubles existed in many countries. England, the



DR. C. C. WANG, CHAIRMAN OF THE COMMISSION ON THE UNIFICATION OF RAILWAY ACCOUNTS

birth place of railways practically had the same experience as that which we have now. It was after suffering for many years and after repeated efforts by both the Government and the railway companies that she has brought her accounts to the present state of usefulness. We are, however, even worse off, since the science of accounting has heretofore received so little attention in China. But the world will judge us, not according to what we did or what we are doing, but according to what we shall do from now on.

If we persist in ignoring the existing disorderly state of affairs, we shall be severely criticised by our neighbors and condemned by our own posterity. On the other hand, if we begin earnestly to make improvements from now on, we shall be entitled to all credit. For, generally speaking, our railway enterprise is still in its infancy, and the evils are still easy to remedy. But, if we miss the present opportunity and wait until the trunk lines are completed, our difficulties will be more than doubled. Therefore, with us the question is not to regret or complain over the past, but to endeavor to make the best out of the future. In railway matters, however, no substantial reforms of any kind can be made unless we go at it full-heartedly and with sufficient time.

After having thus reviewed our own condition, we may look at the question from a general point of view. On account of their monopolistic and other characteristics, railways are always placed under strict supervision or direct control of the State. In exercising this supervision or control, railway men find it desirable or even necessary to begin from accounting. It is largely through the accounts that a fair judgment of the management of a railroad may be made and an inside view of the affairs obtained; and it is only through a proper judgment and a clear understanding of what is going on that a proper supervision or control may be exercised. In other words, accounting is regarded as the key to the management, supervision and control of railways.

From the point of view of state railway management, or that of private lines, an efficient system of accounting is of equal importance The railway business is so multifarious in nature, and so immense in volume, that no railway can be efficiently or economically operated without good accounting. Therefore, the accounting department always occupies an important place in all railway administrations, and accounting is constantly receiving the attention of railway men with a view towards improvement.

In China the importance of railway accounting is even greater. As we have to push the construction of many new lines, foreign capital is necessarily needed. With the right kind of accounting, we can help a good deal in attracting such needed foreign capital. What the average investor wants is safe security and a reasonable rate of interest. If we can only let the world know, by a good system of accounts, what paying investments our railways are, we shall have much less difficulty in securing funds. In fact there are hardly any railways in the world which pay as well as ours. The great trouble is that the outer world does not know our actual conditions. The lack of proper account and statistics is largely responsible for this.

The importance of modern accounting is made more apparent by the evils resulting from the lack of such accounting. The Canton-Hankow and the Hankow-

Szechuan lines are vivid examples. In both cases, the deficiency in accounting has contributed a good share in bringing about the present shameful results. The investors see that so much money is put into the enterprise and then hear that so much is expended, but no one knows exactly what has become of it. If any one should endeavor to examine the accounts, he would be more mystified after the examination than before. Indeed, with such accounts and accounting, fraud is not only easy, but may be tempting. The authorities in charge of these lines were guilty in many respects, but the lack of system was also responsible. As a result, the investors became suspicious and angry. A hue and cry was raised and everything was blocked. Consequently, not only were the lines immediately concerned delayed, but the whole investing public became pessimistic with regard to railway enterprise, and thus the development of the country was kept back, in addition to giving our neighbors good and visible excuse to laugh at us.

Not only in the administration of railways, but in other modern business as well, accounting is of fundamental importance. Indeed, it is often remarked that the failure of some of our most promising enterprises, such as the China Merchants' Navigation Company,is largely due to the lack of good accounting. This is unavoidable, for to manage a modern business on a large scale without the help of a modern system of accounting is like pouring new wine into old bottles.

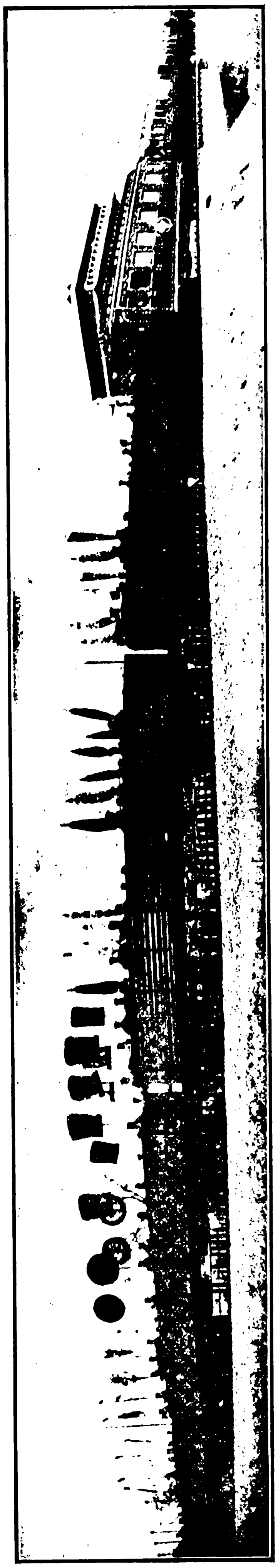
Thus, it may be said that the concealment or imperfect representation of facts, which no one is charged with the duty or furnished with the means of faithfully disclosing, will be found to underlie most of the mishaps in railway matters. There can be little doubt that many objectionable transactions would have been prevented if they were to be immediately followed by publicity. For it is regarded almost as an maxim that publicity is the most effectual preventive of frauds or other irregularities in railway matters.

It may also be added that for railway taxation and the purchase or subvention of private lines, which questions are bound to come up soon, efficient accounting is indispensable. To meet these questions by beginning with the preparation and enforcement of an efficient system of accounts, applicable to all lines, seems to be a good beginning.

But railway accounts should not only be effective, but also uniform for all lines. The importance of uniformity has been repeatedly emphasized by railway men since the forties. England began to take strong measures in this regard from 1868, when the Regulation of Railways Act was passed for the sole purpose of unifying the accounts of all railways in the country. Ever since, continued attention has been given to this matter. As late as 1911, a further step was taken to make some necessary improvements toward the unification of railway accounts and statistical returns. The railway companies themselves have been equally active, as shown by the actions of the Manchester Railway Conference of 1868 (See *Railway Times*, Aug. 23, 1868 and the publications of the Conference) and that of the British Railway Companies' Association. The Association, besides other actions, has appointed a standing committee for the purpose of securing uniformity of practice among all railway companies in rendering their accounts (See Report of Committee appointed by the Board of Trade on railway accounts and statistical returns, 1909). America began in 1887 and has made constant improvements since then. The accounting and statistical matters constitute a great part of the work not only of the Interstate Commerce Commission, but of the railway companies as well. The continental countries also have been paying much attention to this question. Indeed, the unification of railway accounts forms a bright chapter in the railway history of many countries. So far as experience shows, there is hardly any question that the railway accounts of a country should be unified.

The advantages of a unified system of railway accounts are numerous. Besides preventing the "dressing" of accounts to a considerable extent, the auditors and inspectors would have a convenient guide in their effort to audit the accounts or to ascertain the true state of affairs. The common form would become familiar and people would know what to verify. Moreover, the science of accounting would become somewhat easier to our people; and once one learns the science, one may be employed in any railway office, and may also be transferred from one line to another without much inconvenience. What is more significant, as mentioned before, is that a uniform system will enable those in control of railways to compare intelligently the results of the different systems so as to assist in forming their judgment of each management as well as to enable the directors themselves to profit by one another's experience. Where circumstances are nearly similar and where there is no downright falsification, such comparisons would prove of great value.

To bring about uniformity in accounting, the first step is to adopt some uniform forms of accounts, with rules and regulations governing the application of the same. In adopting these forms, etc., expert knowledge should be used. The aim should be to study the actual condition of our railway accounting first and then to adopt the forms, etc., to meet the existing conditions. In other words, the forms and regulations, etc., should be practical rather than ideal. Stringent rules should not be laid down except after thorough examination of the actual state of affairs. What is adopted should be sufficiently elastic to



FUNERAL OF THE DOWAGER EMPRESS.—FUNERAL TRAIN LEAVING PEKING. THE DECORATED COACH CONTAINED THE COFFIN: THE PRINCES WHO ATTENDED THE FUNERAL OCCUPIED THE CAR ADJOINING

Specially taken for the Far Eastern Review.

meet the varying circumstances of the different lines and at the same time precise enough to enable the directors and the Ministry, as well as the public, to make intelligent comparisons. The guiding principle should be to expose the results of the management and the financial position of the lines as clearly and systematically as possible so that the country may know what our railways are doing.

But uniform forms and regulations alone are not enough to insure uniformity in accounting. There is always room for endless dispute as to whether certain items of expenditure are for renewals or new work or operation. Much doubt could also arise as to whether capital or revenue is to be charged. Therefore, the incomes and expenditures should be classified and put under specific headings, item by item, and the scope of each heading should also be definitely defined. In this respect, the experience of other railways may prove of much help to us. In other words there should be uniformity of practice with regard to the keeping of accounts and the filling up of the prescribed forms.

During the first few years of application, a standing committee of experts and other responsible men may be appointed to watch the progress of the application of the system, to correct defects that may be discovered and to make improvements whenever possible, as well as to settle doubtful questions which may arise from time to time.

Side by side with the unification of railway accounts, railway statistics may well be unified also. In railway administration, statistics are essential to improvements. Much like mercury, with regard to temperature, it tells the rise or fall of the enterprise. Indeed, some of the most able railway administrators practically do little besides the study of a few sheets of statistics every morning.

But the main trouble with us heretofore, was not exactly that we did not know what should be done, but oftentimes our lack of determination, perseverence and definite responsibility. It may be easily recalled that many laudable reforms have been blocked or given up unfinished on account of the lack of definite power and responsibility or the change of certain responsible authorities.

It must also be borne in mind that in enforcing any uniform system of accounts, much difficulty, or perhaps even opposition, will arise. After the different lines have been accustomed to their own systems and their own way, they will naturally find much inconvenience in adopting any new system. This has been the experience of other countries, where we almost invariably find much criticism and opposition against the introduction of uniform accounting, especially at the beginning. But after an earnest trial they have invariably found that their inconvenience in adopting the uniform system, is more than repaid. We may reasonably expect some difficulties of this sort, but such difficulties are likely to be, or should be only temporary.

From the above, it may be seen that the unification of railway accounts and statistics is recognized by railway authorities of many countries as most essential. Our own disorderly state of affairs especially demands some sort of a uniform system. Therefore, if some uniform system now be adopted, much confusion and irregularity may be prevented in the management of our railways and some proper publicity may be given to our railway property. Even should the existing roads fail to adopt it, for the guidance of the future lines alone it is worth while. Sooner or later, the unification of railway accounts and statistics is bound to come. When it comes, it will occupy a bright chapter in the history of our railways.

Unification Committee Appointed

The Minister of Communications has given distinct earnest of his intention to encourage a reorganisation of railway matters by appointing a Commission to investigate the existing systems of accounting and inaugurate a unified system for adoption throughout the country.

Whilst the Director-General of Railways has been made the head of this Commission the active head will be Dr. C. C. Wang, who has been appointed Chairman.

Already several meetings have been held, and as this is the first step in a movement to bring the railway system to a plane where it may be managed efficiently and profitably, we publish herewith the procedure to be adopted to give effect to the work of the Commission, and the regulations governing that body:

Procedure of the Commission

The procedure with regard to the unification of railway accounts shall be divided into three periods:—

Period of Preliminaries.
Period of Investigation.
Period of Preparation.

Period of Preliminaries:—(about ten days).

1.—The Regulations of the Commission shall be prepared and adopted with the sanction and enforcement thereof by the Ministry of Communications.
2.—The Chairman of the Commission shall be appointed by the Minister and vested with a seal of service.
3.—The Commissioners shall be recommended to the Minister for appointment, and the members of the secretarial staff shall be appointed by the Chairman.
4.—The Commissioners shall be commissioned by the Minister.
5.—A preliminary meeting shall be held for the discussion of the method of procedure in the second period.
6.—The formation of the Commission shall be officially announced by the Minister, or through other proper authorities, to the railways and to those organizations having close connection with the Commission.
7.—The Chairman of the Commission shall inform the railways of the sending of Commissioners to study the systems of accounts and statistics and the practice and working of the accounting department, and shall request each railway to prepare separately, within three months, a detailed statement of its accounting system and the rules and regulations thereof, giving views and suggestions as to what and how improvements upon its present system can be made. The Ministry of Communications shall request the Ministers accredited abroad, such as Great Britain, the United States of America, Germany, Switzerland, etc., to secure from the railway authorities the rules and regulations governing, and the different forms used in railway accounts and accounting for reference.

Period of Investigation:—(about three months).

1.—The Commissioners shall visit the different railways assigned, and study carefully the systems of accounts, and the practice and working of the accounting departments.
2.—The associate members of the Commission shall prepare detailed statements prescribed in sec. 7, first period.
3.—A representative shall be sent abroad to engage expert advisers.
4.—The secretarial staff shall attend to translations, the regular secretarial business, etc.

Period of Preparation:—(about nine months).

1.—A formal meeting shall be held for the preparation of the method of procedure.
2.—The Commissioners, together with the expert advisers, shall visit the different railways previously designated and shall spend three days on each railway in investigation.
3.—The Commission shall begin its work after the completion of the work above enumerated.
4.—Besides reporting its progress to the Ministry from time to time, the Commission shall make a detailed formal report at the end of its term, setting forth all the important questions discussed or settled, the method of procedure followed, and the conclusions arrived at, together with its suggestions and recommendations regarding the unification of railway accounts.

Besides requesting railway accounting officers to express their opinions from time to time, the Commission welcomes all suggestions which may help to bring about the unification of railway accounts of Government lines.

Regulations of the Commission

I. *Name.*—The Commission shall be known as the "Commission on the Unification of Railway Accounts."

II. *Object.*—The Commission shall unify the existing systems of accounts of Government Railways.

III. *Powers.*—The Commission shall be subject to the Ministry of Communications and under the direct supervision of the Minister.

IV. *Organization.*—The Commission shall consist of

1.—A chairman and a vice-chairman, who shall be commissioned by the Minister of Communications.
2.—Foreign experts in railway accounting, who shall be engaged as advisers by the chairman, with the approval of the Minister.
3.—Six members, whose qualifications shall be graduates of universities or technical institutions in railway accounting, administration, or law, or experienced in railway accounting, who shall be commissioned by the Minister upon recommendation of the chairman.
4.—Six associate members to be chosen from among the accounting officers of the principal railways by their respective directors who shall be appointed by the Minister upon the recommendation of the chairman.
5.—A secretarial staff who shall be appointed by the chairman.
6.—Assistant members to be chosen partly by the railways and partly by the chairman, with the approval of the Minister. These assistant members must be educated or experienced in railway accounting.
7.—The number of the above-mentioned officers may be changed by the chairman with the approval of the Minister.

V. *Duties.*—

1.—The chairman shall take general charge of the affairs of the Commission. The vice-chairman shall assist the chairman to execute the work of the Commission for which they shall be held responsible.

2.—The advisers shall give their opinions and suggestions upon questions brought before them by the chairman and the Commissioners.
3.—The Commissioners shall assist the chairman in carrying out the work of the Commission.
4.—The associate members shall render assistance to the Commission in the unification of railway accounts. They shall act as advisers on questions concerning their respective roads.
5.—The secretarial staff shall take charge of the correspondence, telegrams, translations, accounts, etc.
6.—The assistant members shall do the work of the Commission as directed by the chairman.
7.—The appointment and dismissal of the above mentioned officers shall be made according to contract and the regulations of the Commission. Officers and members of the Ministry of Communications or of Government railways, who are transferred to serve on the Commission, shall continue to receive their regular salary. They shall return to their respective posts in the Ministry or the railways when the Commission is dissolved.

VI. *Expenses.*—The expenses of the Commission shall be paid by the treasurer of the Ministry of Communications according to the budget submitted by the Chairman and approved by the Minister. In case of any extraordinary expenditures not included in the estimates, the Chairman shall report such expenditures to the Minister, but the amount of such additional expenditures shall not exceed twenty-five per cent. of the original budget.

VII. *Detailed Regulations.*—Detailed regulations governing the work of the Commission may be adopted from time to time by the Chairman, with the approval of the Minister, but they shall not be in conflict with the regulations of the Commission.

VIII. *Term.*—The term of the Commission shall be one year, beginning from the day on which the regulations are approved by the Minister. The term may be extended, if necessary, with the approval of the Minister, in which case an additional budget shall be made.

IX. *Report.*—Besides reporting its progress to the Minister from time to time, the Commission shall make a formal, detailed report of its work with conclusions, suggestions and recommendations at the end of the term for enforcement, by the Ministry.

X. *Revision.*—The regulations of the Commission may be revised or modified, if necessary, upon recommendation of the Commission with the approval of the Minister.

THE FUNERAL OF THE LATE DOWAGER EMPRESS LUNG YU

On the morning of April 3, exactly a fortnight after the impressive National Memorial Services, the mortal remains of the late Lung Yu, Dowager Empress, left Peking by train for their final resting place. The coffin is to be entombed at Hsi Ling, the Western Imperial Tombs, at Liangkachuang, which is connected with Peking by a branch line joining the Kin-Han Railway at Kaopeitien. Hsi Ling is the mausoleum of the late Emperor Kuang Hsu, and the late Empress Tzu Hsi.

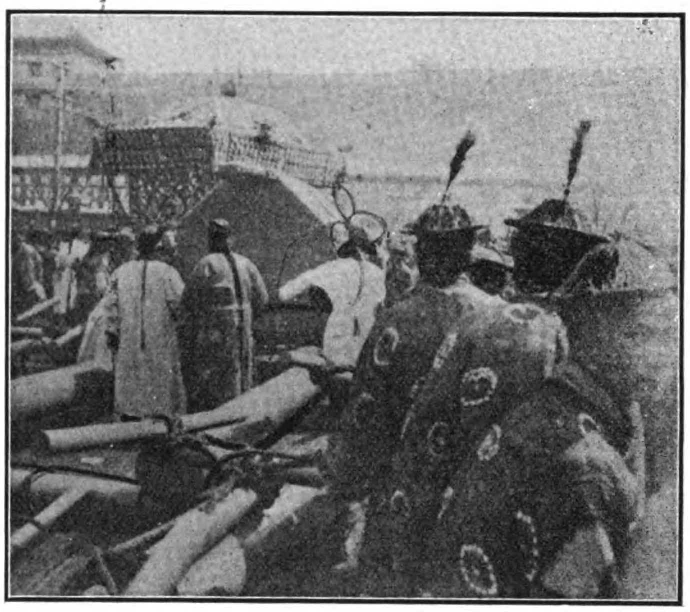
The interesting feature to readers of the FAR EASTERN REVIEW is that this is the first time in the history of China that the remains of royalty have been conveyed by train to the Tombs.

The funeral car was specially prepared for the occasion, an old third-class coach being deprived of one end to permit of the coffin being wheeled in, and being repainted and decorated. It was handsome and effective for the purpose. One of the photographs published in this issue shows how the bier was wheeled into the car.

The funeral procession was timed to leave the Palace at 7 a.m. and much earlier than that crowds of spectators lined both sides of the road from the Palace to the Kin-Han Railway Station.

The funeral procession did not emerge from the Tung Hua Gate of the Forbidden City until about 8 a.m. It was preceded by a number of camels laden with tent-poles, tents, and other equipage. They were followed by fifty white ponies, each led by a groom. Next came a train of followers attired in rainbow muslin with thick felt hats, from the centre of which yellow feathers projected. They escorted three Peking carts with yellow wheels and bodies, and silk covers of the same colour. Behind them were the three sedan chairs, also of Imperial yellow. More attendants, carrying wooden halberds, and embroidered fans, banners and umbrellas, marched immediately in front of yellow palanquins containing artificial flowers. These were escorted by Buddhist lamas in yellow robes crossed by crimson sashes, each carrying a large stick of smouldering incense. They were succeeded by a troop of cavalry of the Imperial Guard, and a detachment of mounted constabulary.

The bier was preceded on each side of the road by double files of infantry of the Third Division, in full marching order, with arms reversed. Between these troops were attendants who at every few steps flung handfuls of fictitious paper coin into the air. This continuous shower of paper discs heralded the approach of the bier itself, which was covered with gorgeous yellow silk, embroidered with phœnixes. It was carried by eighty coolies and was of such enormous weight that the bearers staggered under the burden, advancing only a few feet at a time.



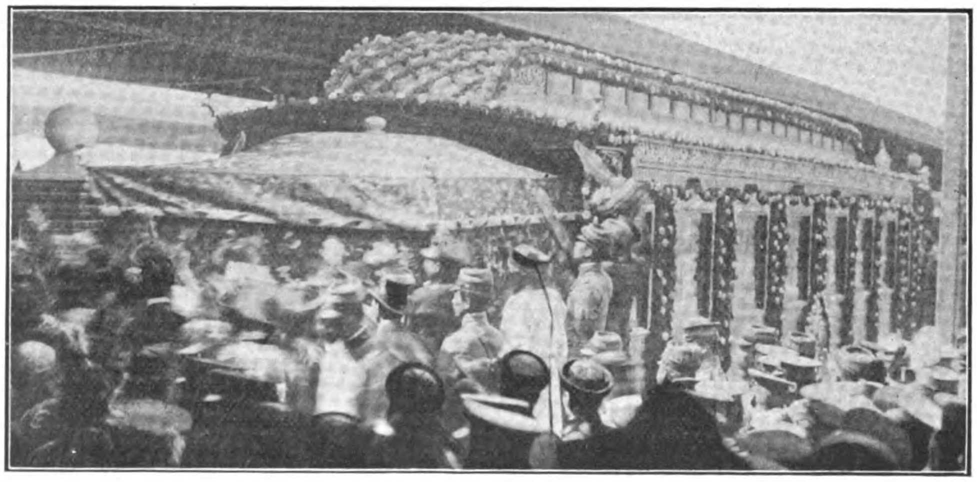
FUNERAL OF THE DOWAGER EMPRESS.—COFFIN BEING REMOVED FROM THE CATAFALQUE AT PEKING RAILWAY STATION. *Specially taken for the Far Eastern Review.*

At the Kin-Han Railway Station, the coffin was transferred to a specially prepared bier which was placed on a low truck, and was pushed up an incline into the funeral car, the band meantime playing Chopin's funeral march.

Officials representing every department of the Government, and strong detachments of troops, were assembled at the station.

Among those who accompanied the ex-Empress' remains were Generals Yin Chang and Feng Kue-chang, Mr. Chang Kuan-chien, Governor of Shuntien-fu; Princes Na Yen-tu and Tsai Yun; Mr. Chu Chi-chien, Minister of Posts and Communications; Mr. Yi Kung-cho, Director-General of Railways; Mr. Tseng Kuang-hsiang, Inspector-General of Railways; Mr. Kuan Mien-chun, Director of the Peking-Kalgan Railway, and several other officials specially deputed by the Ministry of Communications.

The train steamed slowly out of the station just after noon, troops presenting arms and a military band playing a solemn dirge.



FUNERAL OF THE DOWAGER EMPRESS.—THE BIER BEING WHEELED INTO THE SPECIAL FUNERAL CAR AT PEKING FOR TRANSPORTATION TO THE WESTERN TOMBS. *Specially taken for the Far Eastern Review.*

It is reported from Santiago de Chile that a Japanese company has decided to erect two fish-curing establishments in Chile, one in the north and the other in the south. The Chilean Government is affording special facilities to the company, which will introduce Japanese methods of fish-curing in Chile.

THE BIG LOAN

THE AGREEMENT SIGNED AT LAST

Sometime after midnight on April 27 the Reorganisation Loan of £25,000,000 was signed at Peking. Readers of the FAR EASTERN REVIEW will recollect that in October 1912, we published a survey of the negotiations up to that time, while in the February issue a summary of the Loan Agreement appeared. In March we published the full text of the Agreement and the subsidiary Agreements.

The conditions remain the same in many respects, but, of course, the American Group withdrew from participation and the Powers interested are Great Britain, France, Germany, Russia, and Japan. The terms remain the same with the important modification that the rate of interest is fixed at five per centum, while China will receive 84 for the bonds. It will be remembered that under the original Agreement the interest was to be five and a half per centum and China was to secure a net price of not less than 90½ for the entire loan.

The Kuomintang Party warned the Bankers against signing the Agreement, declaring that unless the Agreement were approved by Parliament it would be considered invalid. However, the Bankers replied that the Agreement was with China and that they could not take official cognizance of a protest from a political party. It is understood at the moment of writing that the Kuomintang is contemplating measures to render the protest effective.

Some time prior to the signing of the Agreement, acting on good advice, the Chinese Government selected a number of foreigners for employment in the reorganisation of the Salt Gabelle, and these are acceptable to the Group.

The Government has been successful in securing Sir Richard Morris Dane, of the Indian Civil Service, as Adviser to the Salt Administration.

Sir Richard Dane has been Inspector-General of Excise and Salt for India since 1907. He entered the Indian Civil Service in 1872 and has held various important posts, including that of Deputy Secretary to the Government of India in the Finance Department, and Commissioner of North India Salt Revenue.

As Advisers to the Audit Department the Government has appointed M. Konavaloff, a Russian, who is a Commissioner of Customs, and M. Padoux, a Frenchman. The former was the Inspector-General's Private Secretary in 1900, and was Commissioner of Customs at Newchwang during the Russian occupation. He was the first Commissioner of Customs at Harbin, where he succeeded in safeguarding Chinese interests while maintaining cordial relations with the Russian authorities.

Other foreigners selected are as follow:

A Japanese, Mr. Tei Nagasama, formerly Japanese Consul-General at Tientsin, where he made an elaborate study of the Changlo Salt Administration. He is a brother of the Chinese Secretary of the Japanese Legation in Peking.

A German, Herr Mohr, has been appointed on the recommendation of the Deutsche Asiatische Bank. He has made a special study of salt administration in Shantung, where he will remain.

A Danish subject, Mr. Gimbel, the well-known chemist and engineer, who will probably go to the Lianghuai Administration.

An Irishman, Mr. Cooper, a graduate of the School of Economics, London, and latterly a Professor of Peking University. Mr. Cooper is an able accountant and is already attached to the Head Office of the Salt Inspectorate.

An America, Mr. Palmer, a graduate of Cornell University, goes to Newchwang.

A Japanese industry in which improvement and standardisation are needed is the manufacture of olive oil. With this in view, the Department of Commerce and Agriculture has sanctioned a grant of Y.600 to the experimental farm in Kagawa prefecture for the purchase of up-to-date presses.

PUBLICATIONS

THE CHINA YEAR BOOK 1913

By H. G. W. Woodhead (Editor of the *Peking Daily News)* and H. T. Montague Bell, B.A. (formerly Editor of the *North-China Daily News)*. Crown octavo. About 730 p.p. With a portrait of President Yuan Shih-kai and a production map of China. London: George Routledge & Co; New York: E. P. Dutton & Co.

This is the second issue of the *China Year Book*. The first issue promised well, and the issue now at hand has fulfilled the promise remarkably well. The work of compilation for such a book is an extremely difficult one, for China has not yet reduced statistics to a science, and what Mr. Woodhead—who is the active editor in China, Mr. Bell being in London—has accomplished in the direction of providing the most reliable data obtainable on all phases of interest in the Republic, is highly creditable.

There is no book of reference published on Chinese matters which can approach the *China Year Book* for general completeness and usefulness, and no one interested in China could be without a copy and claim to be in touch with the solid facts concerning the Republic. Certainly no library could afford to neglect to shelve the work, for it should be the readers' *vade mecum*.

The first issue described China as it was on the eve of the Revolution, and this one brings it to date. The book has been almost entirely rewritten for the 1913 edition, and expanded by about 250 pages.

In addition to all the features of the first edition—which have been thoroughly revised, and brought down to date—many additions have been made.

The railway section has been considerably expanded. The Chapter on Finance, which occupies upwards of sixty pages, deals exhaustively with the finances of the Republic, the Imperial Budget for 1912, the Salt Gabelle, China's Foreign debts, and the Loan Negotiations in 1912.

In the Chapter upon the Government the new Official Systems of every Ministry are given.

Chapter XXI (Constitution Reform) contains careful translations of the Election Laws of the Senate, House of Representatives, and Provincial Assemblies.

The treatment of Religions has been greatly extended, particularly as regards Buddhism, and the Lamaist system of Tibet.

Dr. Douglas Gray, of H.B.M's Legation, has contributed a chapter upon Public Health, to which are appended the resolutions of the International Plague Conference, and details of the North Manchurian Plague Prevention Service.

Some seventy pages are devoted to a political survey of the first ten months of 1912, all official documents of permanent value being quoted textually.

An entirely new feature is a "Who's Who" of some three hundred prominent Chinese officials, though this can bear improvement.

In the section devoted to "Greater China" recent developments in Mongolia and Tibet, are fully dealt with, and a complete list of Mongol Tribes, Banners and chieftains is given.

Chapter XXVII "Miscellaneous" contains directories of Foreign Legations and Consulates, and the Customs and Posts, the full text of the International Opium Convention of January 1912, and an account of Political Societies and Parties in China.

An Index to some 4,000 subjects adds to the utility of the work for purposes of reference.

Leiman Bros.—An attractive circular has been issued by Leiman Bros., of 62 John Street, New York, in reference to their vacuum pumps and vacuum cleaning outfits. The booklet is well illustrated and gives a large amount of valuable information in relation to Leiman Bros. manufactures.

A E G Journal.—The January and February numbers of the A E G Journal issued by the Allgemeine Electricitaets Gesellschaft contain several articles of interest and a number of remarkably fine illustrations.

Scherzer Rolling Lift Bridges.—An extremely attractive volume has been issued by the Scherzer Rolling Lift Bridge Co. to illustrate their moveable bridges. This is the second edition and is really a work of art. The illustrations are splendidly reproduced and a complete summing up is given of the reasons why the rolling lift bridge system is a logical necessity to meet modern conditions. A notable section of the volume is that devoted to drawings showing views of the Scherzer Rolling Lift Bridges in operation or under construction.

Mr. Albert H. Scherzer, President of the Scherzer Rolling Lift Bridge Co., has issued a thoughtful and valuable booklet entitled "Great Money Energy for Individual and Public Welfare." We are sorry that we have not at the moment space to give an extended notice of Mr. Scherzer's work which points out the immense waste that results from the failure adequately to control the water supply of the United States. The arguments adduced are interesting and substantial, and the booklet should certainly be widely read and considered.

American Blower Company.—A splendidly got-up publication is the illustrated sectional catalog No. 316 of the American Blower Company. This catalog relates to the "ABC" moist or dry kilns, and the information given is most complete. Bulletin No. 352 of the "ABC" gives exhaustive information about the "Detroit" steam traps.

Trus-Con Products.—The second edition of the handbook on Trus-Con Products is a remarkable and interesting work. It contains 98 pages fully describing the products of the well-known Trus-Con laboratories at Detroit, Mich. The value of the handbook is greatly increased by the excellent illustrations.

Handbook for China.—An excellent handbook for China by Carl Crow has been issued by the Hwa-Mei book concern. This work is intended particularly for the newcomer to China, but will also be found eminently serviceable by residents. Descriptions of various parts of China are given with information as to hotels, routes and fares. There are several plans of cities in China and numerous interesting illustrations.

Chosen Railway.—The Chosen branch of the Japan Tourist Bureau has issued an attractive leaflet containing information in regard to the Korean Railways. A timetable is included.

South Manchuria Railway.—An interesting history of the development of the South Manchuria Railway since its inception in 1906 has been published. It is fully illustrated and contains much valuable information about this progressive line.

Chicago Pneumatic Tool Company.—Bulletin No. 124 issued by the Chicago Pneumatic Tool Company deals particularly with pneumatic riveting, chipping, calking and stone hammers. The booklet is excellently produced and well illustrated.

Mr. R. J. Ward, known in Japan as Omori Ward, who went to England to live in retirement after a forty-two years' residence in the Far East, has died at the age of 65. Mr. Ward, arrived in Japan in June 1871, entered the service of the Imperial Government Railway Department and was closely connected with the railway development of the country. With the exception of a short trip to Shanghai he only left Japan once during his forty-two years' residence.

The contract for the engagement of Mr. A. W. U. Pope, General Manager of the Shanghai-Nanking Railway, says the *Peking Daily News*, has expired, and owing to the meritorious services rendered by him the Director, Mr. Chung Wen-yao, has recommended to the Ministry of Communications the continuance of the contract for one year.

Sir Robert Bredon left Peking on April 15 for a brief holiday in Europe.

THE WORKS OF THE BETHLEHEM STEEL COMPANY

The Bethlehem Steel Company was originally founded in 1857 under the name of the Saucona Iron Company, and it at first confined its energies entirely to the manufacture of iron. In 1859 the title of the company was changed to "The Bethlehem Rolling Mills and Iron Company," this name being shortened in 1861 to "The Bethlehem Iron Company." It was not till 1899 that "The Bethlehem Steel Company" was incorporated. Since that time its scope has been much widened, and the works have been considerably increased in size—more than doubled, in fact—department after department having been added. The company has also acquired controlling interests in a number of other undertakings, including shipyards, iron mines, wagon works, &c. It is hence in an exceedingly strong position and is the only corporation in the United States which is able to supply the whole armament equipment and armour for a modern battleship.

The works at South Bethlehem are claimed to form the most complete individual plant in the United States for the manufacture of every kind of steel. The equipment comprises blast furnaces, pig casting machines, coke ovens, and all the other requisite arrangements for the conversion of raw material into steel castings, forgings, and rolled sections. The works cover a tract of land 2½ miles long by an average width of half a mile. In normal times employment is found for from 12,000 to 15,000 hands.

The blast furnace store-yard has a storage capacity of 1,000,000 tons of coal, coke, ore, &c. There are six blast furnaces which are 90ft. high, with a 22ft. bosh and an 11ft. 6in. hearth. Working in conjunction with them are Siemens-Cooper-Cochrane, or McClure stoves, 100ft. high. The company built its own blowing engines. They are of the internal combustion type, and use blast furnace gas. There are two pig casting machines. The machines are of different capacities. The first can turn out 1,000 tons a day, and has 180 moulds for 125 lb. pigs. The other machine has an output of 1,800 tons per day, and is provided with 278 moulds for 125 lb. pigs. The company produces a grade of iron known as "high-phosphorus Bethlehem machine-cast pig iron," as well as low-phosphorus Bessemer and basic, and has turned out some large castings, among which may be mentioned a tunnel elbow for the Canadian Electric Power Company, which weighed 56 tons, and steam cylinder castings up to 50 tons.

There are two store-yards for the open-hearth furnaces. One of these is 950ft. long by 87ft. wide. It is served by three electric overhead travelling cranes of 20 and 60 tons capacity respectively. The other yard is 790ft. long by 84ft. wide, and is provided with two 10-ton overhead electric travelling cranes. The materials are delivered to the charging floors of the furnaces by narrow-gauge railways. One of the charging floors is 477ft. long by 28ft. wide, and the other is 890ft. long by 50ft. wide. The furnaces in plant No. 1 include the following:—Two 10-ton basic furnaces; five 40-ton basic furnaces; two 50-ton basic furnaces; one 40-ton acid furnace. These are fed by electric charging machines, and have Siemens gas producers. The length of floor occupied by the furnaces is 623ft. In plant No. 2 there are ten 50-ton furnaces, with their producers, and the length of floor occupied is 890ft. These furnaces work in conjunction with a hot mixer, the latter being in direct connection with the blast furnaces.

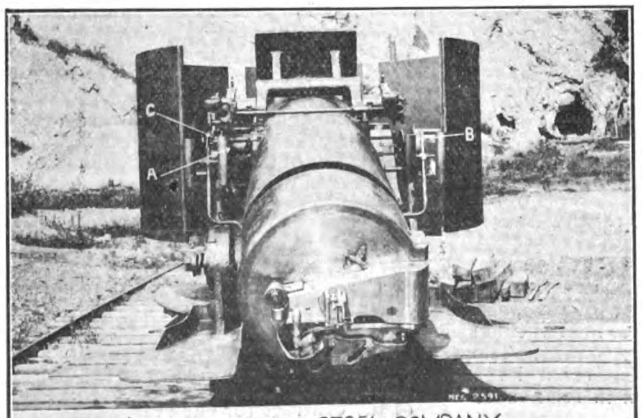
VIEW OF BETHLEHEM STEEL CO.'S GUN FINISHING MACHINE SHOP. THE GUN SHOWN IN FRONT OF THE PHOTOGRAPH IS OF THE BETHLEHEM 5-IN. 51 CALIBER RAPID FIRE GUN ON A NAVAL PEDESTAL MOUNT.

The five 30-ton basic furnaces in No. 1 plant combined to produce what is certainly among the largest steel castings ever made. It was part of a 12,000-ton capacity armour-plate press which was built by the Bethlehem Company for the Carnegie Steel Company of Pittsburg. The weight of the casting was 145 tons. In addition to ordinary mild steel castings, large quantities of alloy steel castings are made, such as the nickel steel frames for locomotives. For a company turning out such heavy pieces as have been mentioned special transporting plant is necessary, and one of the firm's railway wagons has no fewer than 32 wheels and weighs 87 tons. This wagon was designed and built by the Carnegie Company.

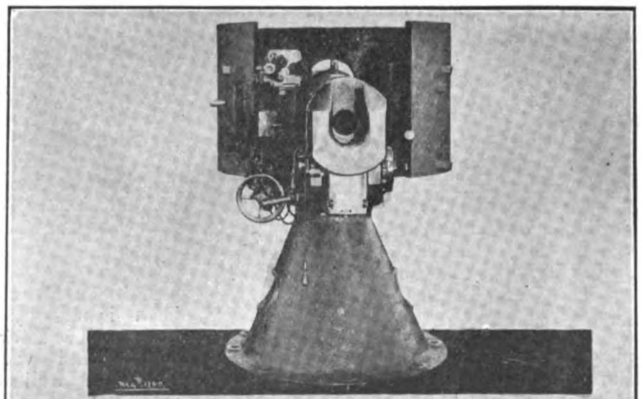
For the tubes and jackets of guns nickel steel is largely employed, and the ingots, whilst still molten are subjected to heavy compression in hydraulic presses. In addition to nickel steel, the company uses the following metals for making alloys for various purposes—chromium, vanadium, tungsten, and titanium. About 100 tons of crucible alloy steels are made per week.

The forging plant comprises a number of hydraulic presses, among these being two of 2,500 tons and 5,000 tons capacity respectively. The latter is capable of handling the large forgings necessary for big guns, turbine drums, and shafting, as well as large crank shafts for stationary and marine engines.

Of recent years the tendency has shown itself for some American armour-plate manufacturers to forge armour-plates under hydraulic presses instead of rolling them in heavy mills. The Bethlehem Company was, we believe, the first to apply forging for this purpose, and we understand that it has found no cause to regret having done so. Those firms which still go on rolling plates claim that they are superior to those forged in presses, and the advocates of forging are not slow to say that their products are better than those produced in mills. As both types of plates readily pass the standard tests, it would be difficult to say which, if either, is the better method of manufacture. It is significant, however, that whereas the Carnegie Company used to roll its heavy plates, it now forges them. The advocates of the forge urge that as a rolled plate has concave edges, it shows that the centre has not



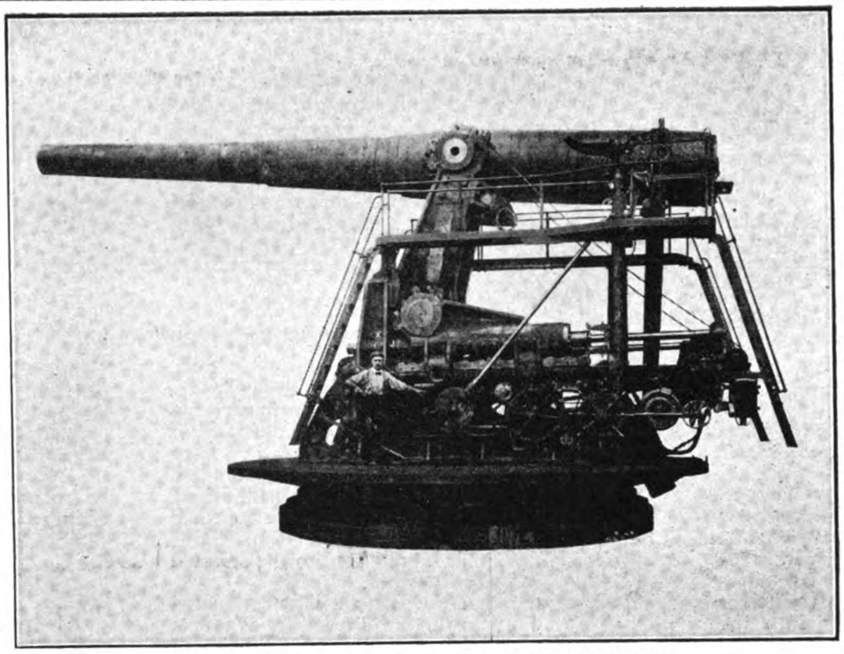
BETHLEHEM STEEL COMPANY.
7 IN. PEDESTAL MOUNT No 1.
A—L.H. TRIGGER B—R.H. TRIGGER C—BELL SWITCH.



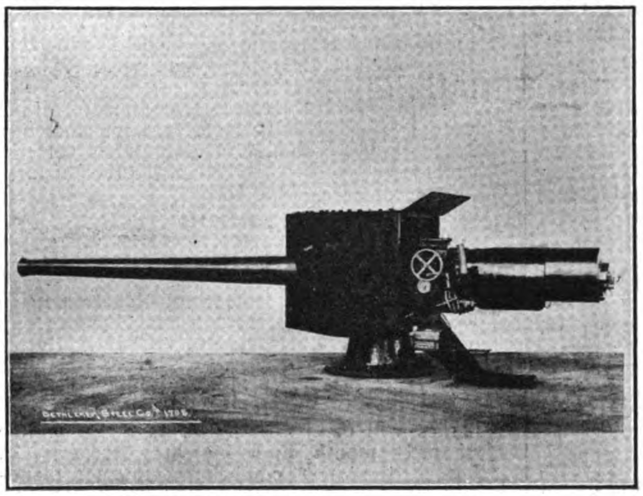
3" (14 PDR) SEMI-AUTOMATIC GUN AND MOUNT,
DESIGNED AND BUILT
—BY—
BETHLEHEM STEEL Co
SO. BETHLEHEM, PA. U.S.A.

received as much "work" as the front and back, and point out that, on the other hand, a forged plate has convex edges. They contend, too, that in ordinary engineering circles it is admitted that a rolled bar is inferior to a hammered bar, which, in turn, is inferior to a bar forged under a hydraulic press.

Another large press owned by the company is of 14,000 tons capacity. It has two rams, each of 50½in. diameter. To facilitate the handling of the plate during forging there are longitudinal and transverse carriages at the base of the press, and these carriages are hydraulically controlled. The press is served by two hydraulic cranes, each of 200 tons capacity. This large lifting capacity is necessary so as to handle the heavy plates and the enormous porter bars required for their manipulation. The working pressure is about 3½ tons on the square inch, and the necessary pressure water is provided by a 15,000 horse-power pumping engine. This engine has three vertical steam cylinders and three horizontal pumps. The piping which connects the pump cylinders to the press is of hollow-forged nickel steel. For bending armour plate a 7,000-ton press is used. This is served by two 75-ton hydraulic cranes and by direct-fired furnaces with movable car bottoms. This is electrically driven.



12 IN. GUN ON DISAPPEARING MOUNTING.



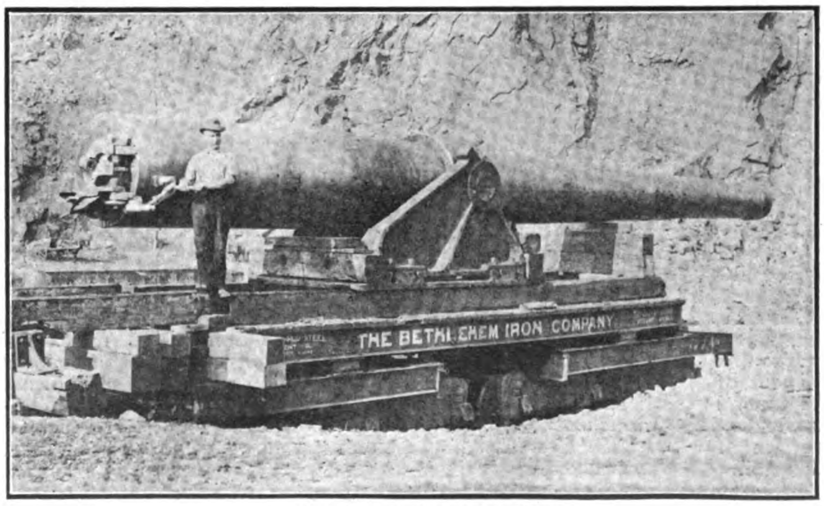
5 IN. GUN AND NAVAL MOUNTING.

The armour plate machinery shop is well equipped with the special large machines which are necessary for finishing the plates, these including planers, saws, drills, and grinders. The machines are of both the fixed and portable types. In this shop the side armour for ships is machined and fitted, and turret armour built up. The Company also manufactures special armoured vaults for banks, safe deposit companies, government, and other offices, &c. Sometimes the weight of armour in one of these vaults amounts to as much as 1,200 tons.

The Bethlehem Company manufactures all calibres of guns from three pounders up to the new 14in. naval gun. The largest calibre up to the present produced at the works was an 18in. gun for firing Gathmann torpedoes, but the finished weight of this gun is not so high as that of the new naval gun. The Company follows what is practically the standard outside Great Britain and prefers the all-steel built-up guns to the wire-wound variety. The maximum gas pressures, however, exceed those allowable in Great Britain. It is claimed that the lives of American guns during the past few years have been longer than those of English guns, but this is no doubt due not so much to any inherent defect in the gun as to the fact that the American powder contains no nitro-glycerine while the British does. To the onlooker it must be somewhat amusing to note the horror that the British expert has for a pure nitro-cellulose powder. It is only equalled by the astonishment of American ballisticians at anyone using a propellant powder largely composed of nitro-glycerine. Both parties seem perfectly happy in their respective choices, and so far as can be judged one powder seems as safe as the other, for accidents in the two countries which are due to the powder are very nearly non-existent.

The machine shops at these works have a total area of half a million square feet, the largest individual shop measuring 1,466 ft. long by 117 ft. wide. The central bay of this shop, which is 60 ft. wide, is served by ten overhead travelling cranes with capacities ranging up to 75 tons.

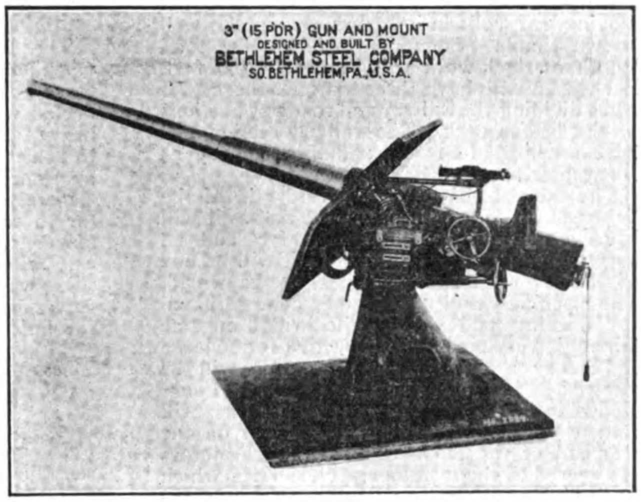
Like all other firms which manufacture ordnance the Bethlehem Steel Company has its own type of breech mechanism for the larger calibre guns as well as semi-automatic and full-automatic mechanism for secondary armament guns.



GATHMANN TORPEDO GUN.

For proving guns and testing armour plate the Bethlehem Company has a proving ground at a place named Redington, which is conveniently situated at a distance of only five miles from the works, and is connected with the latter by a private railway line.

Every description of gun mounting is manufactured at the Bethlehem works, including light and heavy naval mountings, coast defence and garrison mountings, and mountings for mountain, horse, and field guns, and for howitzers. In its smaller mountings the company has a simple and interesting method of operating the elevating and training gears. It consists in employing two hand wheels, one at either end of a short horizontal shaft. The handles on these wheels are arranged at 180 degrees apart, so that a very even turning movement may be exerted. One of the handles carries a firing trigger, and we are informed that exhaustive tests have shown that there is an astonishing increase in the accuracy of fire when this device is employed, the accuracy increasing during the latter part of the trials. This, it is pointed out, is only what might be expected as a gun layer using only one hand will get fatigued more quickly than if he were to use two hands, and a man, even when fatigued, can make much better practice if he can use two hands. It is claimed that this



feature is of all the more importance now-a-days when naval gun layers are being trained to keep sights continuously on a moving target for periods which only a few years ago were considered to be absolutely impossible.

In some of its pedestal mountings the company fits a small two-speed gear-box, so that two-speeds of elevating and training can be obtained. These gears are changed by small treadles on the platforms for the elevating and training members of the gun's crew. Whilst this may be considered a totally unnecessary refinement with a 4in. gun mounting it has proved a great convenience on large pedestal mountings for 6in. and 7in. guns.

The company designs and manufactures all types of turret mountings for guns of heavy calibre, and, while, it is credited with having strong views of its own as to the most suitable methods of working and control, does not appear to force its ideas on intending purchasers, as is evidenced by the fact that it supplies hydraulically and electrically operated mountings, while at time of writing, some operating machinery, which is actuated partly hydraulically and partly electrically is

passing through the works. The Bethlehem Company itself uses principally the Manly hydraulic power transmission machine.

The company possesses a fine plant for the manufacture of rails, and is busily engaged in producing nickel steel and other alloy steel rails. The output of this department amounts to some 1,000 tons per day. The United States being the home of the "skyscraper," it is not surprising to find that the company has devoted a considerable amount of its energy to producing steel sections of beams and columns for structural purposes. As the ordinary girder has a somewhat uncertain strength, and as the unit strengths of test pieces vary considerably in specimens out from the webs and flanges, which in the old horizontal rolls receive very varying amounts of "work" during reduction from the ingot, the company installed Grey mills, employing both vertical and horizontal rolls, so that both flanges and web might receive the same amount of "work." In these mills the relative thickness of flanges and web can be altered at will.

In addition to its other manufacture the company makes large blast furnace gas engines, and specially heavy machine tools, hydraulic presses, &c.—*Engineering.*

LARGE SCHERZER ROLLING LIFT BRIDGE FOR ENGLAND

One of the principal bridge building contracts of last year was placed by the Great Central Railway of England with Sir William Arrol & Company, Limited, of Glasgow, Scotland, for the construction of a large new railway and highway Scherzer Rolling Lift Bridge and approaches across the River Trent at Keadby, in Lincoln, England. The requirements of navigation at this point on the River Trent, just above where it enters into the River Humber, are quite severe and necessitated the most careful consideration in selection of the type of draw span, and the Engineers of the Railway Company visited all of the important modern movable bridges in Great Britain and America before deciding upon the Scherzer type as best fulfilling the requirements of navigation and the very heavy traffic over the bridge.

The structure will be composed of two fixed approach spans in addition to the bascule span and the track girder span upon which the moving leaf rolls in its operation, on the well known simple Scherzer principle. The total length of steel work will be nearly 500 feet. Each span will have three trusses, the center truss dividing the railway and roadway portions of the bridge deck. The railway section will have a width of 29 feet and the roadway 24 feet center to center of trusses.

The moveable span of this bridge is of the Scherzer single leaf through type and as it will have a movable length of 160 feet and an extreme width of nearly 60 feet it will be one of the largest bascule bridges in the world. The machinery and power equipment designed for opening and closing the bridge in one minute is very simple and effective for so large and heavy a structure. The power will be electricity generated in a machinery house alongside the bridge and this current will actuate the motors which are placed on the rear end of the movable leaf. These motors are geared to the main operating shafts which drive pinions engaging with racks on independent fixed supports outside of the plane of the movable bridge trusses. This method of operation is one of the special features of the latest design of Scherzer Rolling Lift Bridges, and reduces the machinery and power required to a minimum even in the largest and heaviest structures.

The substructure will consist of steel caissons carried to about 50 feet below the low water of ordinary spring tides and the masonry piers carrying the superstructure will be founded upon these caissons.

The entire bridge is designed in accordance with the latest practice in both foundations and steel structures to carry the heaviest main line traffic of the Great Central Railway between Doncaster, Grimsby and the large modern Immingham Docks on the Humber River.

Sir William Arrol & Company, Limited will execute the work under the supervision of Mr. J. B. Ball, Engineer-in-Chief of the Great Central Railway Company, by whom the foundation and approach spans were designed. The Scherzer Rolling Lift Bridge Company, Chicago, Mr. Albert H. Scherzer, President and Chief Engineer, designed the superstructure, operating machinery and power equipment of the bascule span, and will maintain a general consulting engineering supervision over the manufacture and erection of that portion of the work in cooperation with Mr. Ball's staff.

THE BANK OF CHINA

The Associate General of the Bank of China, Mr. Nih Chi-wei, has now taken up his duties. He is helping Director-General Sun, in carrying on investigations regarding the conditions of the various ports, and as soon as they have gathered sufficient data they will decide upon the ports at which Branches will be established. When their proposal has received the approval of the Ministry of Finance, sufficient funds will be appropriated and remitted to the selected ports to open these branches.

It is stated that the Bank will be conducted on similar lines to those followed by Western State Banks and has with this object, secured the collaboration of Foreign Experts. Foreign Accountants are also engaged and will be sent to the different Branches. Mr. W. H. Plant, of the International Bank at Peking was selected as chief accountant. He has been "loaned" to the Szechuan section of the Hukuang lines to inaugurate a system of accounts.

PUKOW PORT COMMISSION

The Director-General of the Pukow Port Opening Commission, wired the Chinese Government recently that the duties connected with the port-opening were extremely heavy, and he feared that he would not be able to achieve great success unless he was helped by some energetic person. He requested that General Hsu Kuo-ching be appointed Co-Director to co-operate with him, so that the work may be speedily carried out.

It will be remembered that General Hsu Ko-ching was the commander-in-chief of the allied forces which captured Nanking during the revolution.

CHEFOO BREAKWATER

So much has been said in recent years regarding the Chefoo Breakwater that it will be satisfactory to people who are interested, to learn that there is a probability of a speedy termination of the preliminaries to the establishment of a Commission to carry out the scheme.

In 1910 the Chinese Government made certain proposals to the Diplomatic Body with regard to the building of a breakwater and the establishment of a port at Chefoo. The merchants of Chefoo agreed to the levying of special wharfage and port dues to be utilised for the purpose, but two years were spent in getting the foreign governments to agree upon a definite line of procedure.

Last autumn the foreign governments gave their consent to the scheme of taxation, and they asked the Chinese Government if they would contribute. The Chinese Government replied by stating that they would contribute Tls. 10,000 per year.

As such a work could not be carried out satisfactorily except by a Commission, the Diplomatic Body proposed an Executive Commission of five men, two Chinese Officials, two foreign officials, and the Commissioner of the Customs at Chefoo. Negotiations ensued between the Diplomatic Body and the Chinese Government as to the conditions on which the Commission should function. An agreement has now been reached between the Diplomatic Body and the Chinese Officials upon the subject of the Commission and notes are now being exchanged.

The Chinese Government have indicated their proposals to the Diplomatic Body, and they have been accepted. The first function of the Commission will be to start levying the dues to provide the funds to secure expert advice as to the best method of constructing the port. At present, there are no plans and the experts will have a clean field in which to operate. When they have completed their designs, they will be forwarded to Peking for approval of the Chinese Government and the Diplomatic Body.

OIL

Oil Drilling Methods in Japan.—In connection with the visit of Japanese oilmen to the fields of California for the purpose of learning how to bring Japanese methods up to date, an order has been placed with a supply company in California for no less than £160,000 worth of plant for the Japanese oilfields, says an exchange.

The purchase was made on behalf of the Nippon Oil Company by Mr. K. Ito, who had made a tour of the California fields, in company with two engineers of the company. It is not the first purchase the latter has made in California, and about 12 months ago four experienced California drillers were engaged, and have not yet returned.

Japan produces about 220,000 tons of oil per annum, though recent years have shown a fluctuating production; and it is in the endeavour to stay the decline that the Japanese deputation visited California.

CEMENT

Cement Works in Japan.—The extension works contemplated by various Cement Companies during last year are to be totally or partly completed this year. The new revolving cauldrons fitted up by the Osaka Cement, Hokkaido Cement and Iwaki Cement companies will be in working order by the middle of next month and by May respectively. Under the new conditions, Japan's manufacture of cement in the near future is expected to exceed 3,000,000 barrels per annum. However, the demand for export is yet very small, while the domestic demands such as for hydro-electric and tramway works, which were once booming, are now at an end, and the prospective demands are limited. With little prospect of the demand increasing, the market price of cement has dropped lately. It is a pending question amongst the different companies whether the total output can be consumed in the Empire alone in the event of the manufacture of three million barrels per annum. It is comparatively difficult for cement works freely to increase or decrease the manufacture according to the market condition.

When the Japanese Navy is put off with only a small percentage of its demands, railway development under the State can hardly be expected to receive the attention or the funds that those directly interested in it would wish for; so it is not surprising to learn that the Japanese railway authorities have been compelled to relegate their Y.130,000,000 project for extensions and improvements to the limbo of good intentions. It is now reported that all idea of extension and improvement is hung up definitely for two years. No such definite postponements seem to be forthcoming regarding the Army Division schemes.—*Japan Chronicle.*

FAR EASTERN RAILWAYS

PROJECTED RAILWAYS IN NORTHERN KIANGSU

News from Chinese sources indicates that an unusual amount of activity is being displayed in regard to the building of projected railways in Northern Kiangsu. It is stated that arrangements have been made to build the Tsingkiang-pu-Hwaian-fu section of what is called the "Kiangsu Railway" at once, all necessary land having been secured, and a foreign engineer having been engaged to take charge of the work.

What is precisely meant by the general term "Kiangsu Railway" has been doubtful for the past few years.

Early Schemes

One of the earliest schemes was the Kwa-chow-Tsingkiang-pu line, plans for which were mooted over some five years ago, when work was started on the Shanghai-Sungkiang line.

It was understood at the time that the Kiangsu Railway Company would build the Kwachow-Tsingkiang-pu Railway soon after the completion of the Shanghai-Sungkiang section. But after further deliberation, it was proposed to change the route to make it the Tsingkiangpu-Tungchow line, as Tungchow is considered a more important town than either Kwachow or Yangchow.

This new proposal has had the approval of the majority of the Kiangsu people, although strong objections were raised by the merchants in the immediate vicinity of the old route. Especially vehement were the protestations of the Yangchow and Chinkiang merchants. They contend that on account of inadequate means of communication their trade is suffering seriously, and that they must have this railway to relieve the situation. It has been pointed out to them that the old route would have been an excellent one had it not been parallel to the Grand Canal, but since it is so, there would be keen competition by water-borne traffic. The income the line would get after its completion would not be very large and, therefore, it would not be a profitable investment; instead, it would be a burden on the community and thus defeat its own purpose. But the case with the new route is different. It goes to Tungchow, which is in a south-easterly direction, and it passes several important cities. So it has been decided that the "Kiangsu Railway" is to be the Tsingkiang-pu-Tungchow line.

It will be remembered that the Tientsin-Pukow Railway was originally designed to connect with Chinkiang, but in these early times the Northern Kiangsu merchants did not realize what huge benefits a railway would give them, so, when it was ultimately decided that instead of running to Chinkiang the line was to go to Pukow, there was very little opposition exhibited on the part of the Northern Kiangsu people. But now the rising prosperity of the districts where that Tientsin-Pukow line passes has demonstrated to them clearly the enormous value of railways. They have become aware of the fact that Nanking is getting a great volume of traffic which would have been theirs, and they are deploring their short-sightedness. The desire to make up their loss explains their enthusiasm at present in discussing railway schemes.

Some New Plans

It is reported that recently the Chinkiang and Yangchow merchants had a discussion about railway projects and are determined to have a railway of their own. Their plan was to build a line from Liuhaockow, opposite Chinkiang, to Siennumiao, the famous rice market.

They are reported to have raised enough funds to carry out this project, and the work on this line will soon begin. This short railway will be ultimately extended to Shaopo, to effect a junction with the Tsingkiang-pu-Tungchow Railway.

There is another projected railway crossing Northern Kiangsu which is of far greater magnitude and importance. It is the railway which will connect Kaifeng with some seaport. Originally it was intended to have a port at Haichow. The line would from there run through Hsuchow-fu, of Kiangsu and Kaifeng, of Honan.

This is the first section of the so-called "Belgian" line, or the Lanchow Railway, destined to be one of the longest trunk lines in China.

At Hsuchow-fu, it will effect a junction with the Tientsin-Pukow Railway, and at Kaifeng, with the Peking-Hankow Railway, thus making Northern Kiangsu accessible to the interior provinces. The economical advantages to Northern Kiangsu in this respect cannot be over-estimated, because with efficient means of communication, great developments will take place, and the familiar expression "poverty-stricken Kiangpeh" will soon cease to be true.

The Department of Industry has decided to open up Haichow as a trading port. The site for the port has been selected at a place called Sinpu. The Industrial Department has written to the Communications Department inquiring whether the trunk line from Hsian-fu will run to Haichow as originally designed or will there be any change from this route, so that they may formulate plans accordingly. They also request that a day be appointed to hold a conference regarding this matter.

Three Projected Lines

There are at present three projected railways in Northern Kiangsu, including the short line from Liuhaokow to Siennumiao. This short line will bring Yangchow and Siennumiao into close touch with Tungchow in the east and Tsingkiang-pu in the north. It will also enable the northern cities to get into quick communication with southern cities through Chinkiang, which is on the Shanghai-Nanking Railway.

The Tsingkiang-pu-Tungchow line will pass through the following cities: Tsingkiang-pu, Hwaian-fu, Paoying, Kaoyu, Shaopo, Taichow-ku, Rukao and Tungchow. On the completion of the Tungchow line, an extension may be made to Haimenting.

Haichow, Hwaian-fu, Yangchow, and Haimenting are salt manufacturing centres, and there is no doubt that these projected railways will have an important bearing on the salt transportation problem. The railway will give rapid transit, regular and efficient service and cheaper freight, and the Government will reap great financial benefits by it.

Tungchow is on the bank of the Yangtse River and is an important industrial town. It has cotton, silk-spinning and weaving factories, and bean-oil mills. It produces bean-oil, calico, native cloth, and flour, and it also carries on a thriving fishing trade. It possesses a good harbor named Tien-Sun-kong, and is a port of call by river steamers.

A great amount of rice, wheat, bean, salt and cotton from the northern towns are sent to Tungchow for export.

The ordinary means of transportation are by carts and junks, which process is slow and irksome, and the demand for a railway is growing more emphatic. One of the warmest espousers of the cause is Mr. Chang Chien, who took money out of his own purse and sent out several engineers to survey and map out the route from Tien-Sun-kong at Tungchow to Tsingkiang-pu, passing through Rukao, Taichowku, Kaoyu, etc. After several months' work, the survey was completed.

It was at this juncture that Chinkiang and Yangchow merchants started a hot dispute over the scheme, but that had no deterring effect upon Mr. Chang Chien, and he forthwith made arrangements to procure the necessary funds. He first tried to induce the Chinese merchants to invest in the enterprise, but met with no success. Then he turned to the French merchants, represented by Baron Cottu, and, it is reported, floated a loan of 4,500,000 francs at 4½% annual interest, with 5% discount, repayments to be made within thirty years.

Mr. Chang Chien has recently been in Shanghai concluding the negotiations, and as soon as the first advance is made, the work on the railway will be started.

With the opening up of Northern Kiangsu by a network of railways, industry and commerce will at once be given a fresh impetus, and the land will soon thrive. To complete the transformation, an adequate reclamation scheme must be carried out, especially in what has been termed the "famine district"—the lowland country surrounding Tsingkiang-pu.

The Kaifeng-Haichow Section

The Kaifeng-Haichow line is of great importance, as it will traverse a wide area, pass through two provinces, extending itself to Lanchow, capital of Kansu, on the one hand and join with the Tientsin-Pukow Railway and the Peking-Hankow Railway, on the other. Another probable aspect of this line is that it will make the present unimportant Haichow into a useful seaport, and thus connect the interior with the ocean routes by a straight line.

The value of Haichow as a terminus is much enhanced by its favorable situation. It is near the boundary line of Kiangsu and Shantung, and it is very near to Tsingtao. It is also within a compartively short distance of Nagasaki. By developing Haichow China can have a port of her own at an important point on the coast.

The Kaifeng-Haichow Railway as it will affect Kiangsu, may be conveniently divided into two sections: the Kaifeng-Hsuchow-fu section, and the Hsuchow-fu-Haichow section. The probable points of contact on the Kaifeng-Hsuchow-fu section are Chenliu, Chihhsien, Suichow, Ningling, Kueiteh-fu and Tongshang.

From Hsuchow-fu to Haichow, there are three routes: (1) from Hsuchow-fu to Haichow, via Pechow, which is in a straight line; (2) by following the old Yellow River to Sutsien, and then to Haichow, which is in the shape of a curved line; (3) by going south-east to Sutsien and then northward to Haichow, which resembles the two legs of a right-angled triangle. The straight route calls for less expense, but from the economic view, the route via Sutsien and Tsingkiang-pu would be most advantageous to the development of Northern Kiangsu, and is therefore the best route.

A rough estimate of the expenditure in building the line has been prepared by an engineer and is as follows:—From Kaifeng to Hsuchow-fu, 560 *li*, will cost about Tls. 7,000,000; from Hsuchow-fu to Tsingkiang-pu, 340 *li*, will cost about Tls. 4,000,000; from Tsingkiang-pu to Haichow, 240 *li*, will cost about Tls. 3,000,000, and an extension from Haichow to the beach, reclamation and port-building, about Tls. 3,000,000. In all, it will cost approximately Tls. 17,000,000.

Northern Kiangsu has been visited by several famines during the past few years, and the country has been greatly impoverished. One of the immediate advantages this railway will give is that it will afford substantial relief to the famine-stricken people by giving them work. It will not only help them to tide over the construction period. It will also enable them to find means of living. After the completion of the railway traffic will grow, the town will flourish and demand for labor will increase.

The Tsingkiangpu-Haichow Section

It will be interesting to note that a short section at Tsingkiang-pu has been actually completed. It runs from Tsingkiang-pu north-

ward to Yangchwang, and the work was supervised by a Chinese engineer, Mr. Tu. This section covers a distance of about 10 miles, and a bridge was built across the old Hwangho, a little way north of Tsingkiang-pu.

The Loan Agreement between the Chinese Department of Communications and the Belgian Railway and Tramway Company for the building of the "Kansu-Shensi-Honan-Seacoast Railway" was signed on September 24, 1912. It is significant to note that the last name is in the general term "sea-coast," for it is not yet decided whether the Terminus will be at Haichow or not. It is stated in the Agreement that the eastern terminus may be set at any town north of the Yangtse River, and there is talk now going on to make Haimenting the eastern terminus. But Haichow, nevertheless claims attention. There are, it is claimed, advantages in Haichow to warrant its being made into a terminus of a long trunk line.

The Liang-Hwai Salt Commissioner went to Peking a short time ago to confer with the Finance Minister on the subject of this line. He urged that the Tsingkiang-pu-Haichow section be built as soon as possible, declaring that a great saving would be effected in salt transportation fees. He stated that at present, the salt freight per year was Tls. 800,000. Railway transportation would reduce it to Tls. 400,000, and with other merchandise, the line would be of great profit to the Government.

Mr. Tu, engineer for the northern lines of the Kiangsu Railway Company, made a survey of the section from Tsingkiang-pu to Haichow, and we give below a translation of his report:

PHYSICAL CONDITIONS

1. From Tsingkiang-pu to Nan Liu Tang-ho, is 104 *li*. The land is generally level; there are neither high elevations nor broad waterways. The earthwork and bridge work will not be costly.

2. From Nan Liu Tang-ho to Pe Liu Tang-ho is 34 *li*. The land is a little lower, and during the flood season of 1896, the water was 3 ft. above the ground. The earthwork should therefore be at least 7 ft. On the average, 3,000 *fongs* (one *fong*=10 sq. ft.) of earthwork per *li* will be required.

3. From Pe Liu Tang-ho to Tukow-ho, is 18 *li*. This route is protected by a dyke, and there is no danger of a flood. The earthwork and bridge work will not be costly.

4. From Tukow-ho to Tayisan, is 20 *li*. The water rose to five feet above the ground during the flood of 1896. The earth work should be eight feet high and four feet wider than the ordinary width. Stone protection should be provided on the sides to make it strong enough to resist flood water. The earthwork of this part would be the most costly of the whole section.

5. From Tayisan to Panpu is 28 *li*. The earthwork should be 6 ft. high, averaging 2,700 *fongs* to the *li*.

6. From Panpu to Sinpu or Haichow is 40 *li*. The land is higher, and there is no danger of floods. The earthwork of this section should be the least costly of the whole section.

From the foregoing, it will be seen that a greater part of the line runs through lowlands, and is liable to floods. To avert the danger, it will be necessary to open up the six locks which are at the following places: 1. South Liu Tang-ho; 2. North Liu Tang-ho; 3. Nijeh-ho; 4. Liu-li-ho; 5. Tungmen-ho; 6. Niutun-ho.

At ordinary times, there is a difference of as much as two feet between the water-surface of the east and west locks, and in the highwater season, the difference becomes as much as six feet. The bed of the Yen-ho, is comparatively level; the current is slow, and with the six locks intercepting its progress, the water finds it difficult to flow down, and therefore floods are frequent. If the six locks were opened, the water will flow into the sea rapidly, and floods will be prevented. This work may be carried out at the same time as the railway is being built, and it will give lasting benefit to the community.

CONSTRUCTION WORK

1. *Earth Work.*—The whole section is 244 *li* in length, and the earthwork, averaging 3,000 *fongs* per *li*, will amount to about 732,000 *fongs*.

2. *Bridge Work.*—The longest bridges to be built are those that cross the South and North Liu-tang-ho: these will be 100 ft. in length. Bridges of 40 ft. to 60 ft. may be put across such rivers as the Tachien-ho, Sichien-ho and Hanyang-ho, etc.

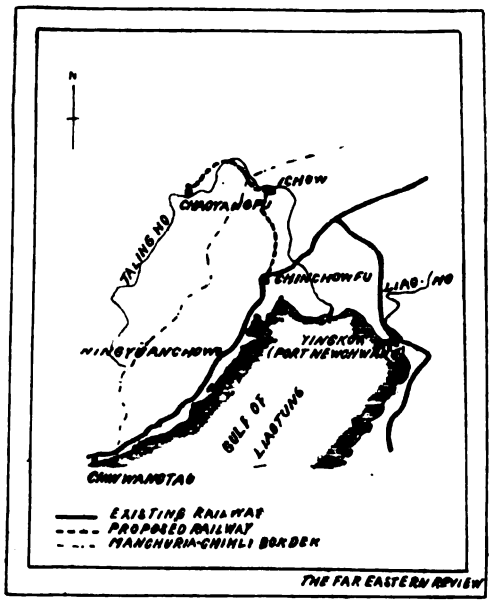
3. *Railway Stations.*—There will be ten stations in this section, viz., Tsingkiangpu, Hsipa, Tahinchwang, Liangkiayi, Kaokiakow, Pechaokow, Tayian, Chungcheng, Taiping, and Sinpu.

It may be estimated that the roadbed will cost on the average about $8,000 per *li*, and that the construction cost, including iron rails, sleepers, stone, rolling stock and other items will amount to another $8,000, thus bringing the total construction cost to about $16,000 per *li*. The total of the whole section of 244 *li* may cost roughly $4,000,000.

PROBABLE INCOME FROM THE LINE

1. *Salt Freight.*—This line will handle about 4,000,000 bags of salt, at 10 cents per bag, amounting to $400,000.

2. *Bean oil and Bean cake.*—500,000 pieces per year, at 8 cents per piece. The freight will amount to $40,000.



3. *Bean.*—100,000 piculs per year, at 10 cents per picul. The freight will amount to $10,000.

4. *Wheat.*—300,000 piculs per year, at 10 cents per picul. The freight will amount to $30,000.

5. *Flour.*—200,000 piculs per year, at 10 cents per picul. The freight will amount to $20,000.

6. *Miscellaneous cereals and merchandise.*—Estimated at 500,000 piculs per year, at 10 cents per picul, it will bring $50,000.

7. *Reed bags for salt-packing.*—250,000 bales per year, at 10 cents per bale, the freight will be $25,000.

8. *Passenger traffic.*—Estimated at $12,000 per month, it will be $144,000 per year.

The grand total of the above eight items comes to $719,000, as annual income for the line.

DISBURSEMENTS

Interest on construction cost calculated at 7% per annum, will be about $280,000.

Maintenance fee, at $1,000 per *li*, will be $240,000 annually.

The total of the above two items come to about $520,000. The surplus each year therefore should be about $199,000. This is of course a modest estimate based on present conditions, and when developments take place, the income will naturally increase.

Chinchow-Chaoyang Extension

The proposed extension of the Peking-Mukden line, by a branch to Ichow and Chaoyang-fu from Chinchow-fu, is like many other propositions in China, being held up for want of money. The route has recently been surveyed, and estimates of cost of construction made, but patience will have to be exhibited by the engineers of the Peking-Mukden line, until the new Parliament can settle down to business and see its way clear to vote the necessary expenditure.

Some time ago a preliminary was made from Chinchow-fu to the coal mines at San-I-chan, but nothing more was ever done as regards a line to the mines. Last spring, however, the Ministry of Communications asked for a line to be surveyed to connect Chaoyang-fu with the Peking-Mukden railway, and this work was recently undertaken by Mr. D. P. Ricketts, Engineer-in-chief of the Peking-Mukden line.

Part of the former route selected by Mr. Wilson was utilised and re-adjusted as far as Ta-Pan. The crossing of the Taling-ho was shifted further west, and the location carried along the north bank to Chaoyang-fu, after several lines had been surveyed.

The country here is very mountainous and difficult for economic railway construction.

There are several coal deposits in the region, and more might be found if the hills were properly prospected. There are indications of copper, iron and gold, and, near Chaoyang, a considerable vein of asbestos exists.

In connection with the proposed linking of Chaoyang-fu with Chinchow-fu, on the main line from Peking to Mukden, it is interesting to note that a separate proposal is being made by the Tutuhs of Fengtien and Jehol to connect Chaoyang-fu with Mukden and Jehol. If this line is undertaken it will start from Hsinmin-tun and run west by south to Ichow, on to Chaoyang and south-west to Jehol.

Already there is a proposal to lay a light line from Peking to Jehol. But why a light line? A railway along this route would seem to be a necessity, and this would give Jehol connection with the sea, via Tientsin.

One advantage of a connection between Peking, Jehol and Mukden would be that it would give a more direct route to Europe than that which is now followed, via Tientsin and the sea-coast line. It would also be an extension, as it were, of the Canton-Hankow-Peking trunk line.

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended March 22 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913	50,512	11,470	61,942
1912	48,486	5,420	53,906
Increase.	2,026	6,010	8,076
Decrease	—	—	—

For eleven weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	574,482	109,089	683,571
1912	570,000	54,805	624,805
Increase.	4,482	54,284	58,766
Decrease	—	—	—

Week ended March 29:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913	53,252	10,351	63,603
1912	46,889	5,119	52,008
Increase.	5,363	5,232	11,595
Decrease	—	—	—

For twelve weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913	627,734	119,440	747,174
1912	616,889	59,924	676,813
Increase	10,845	59,516	70,361
Decrease	—	—	—

Week ended April 5:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	49,069	9,431	58,500
1912....	50,638	6,030	56,668
Increase.	—	3,401	1,832
Decrease	1,569	—	—

For thirteen weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	676,803	128,871	805,674
1912....	667,527	65,954	733,481
Increase.	9,276	62,917	72,193
Decrease	—	—	—

The week ended April 12:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	48,998	10,996	59,994
1912....	54,722	6,298	61,020
Increase.	—	4,698	—
Decrease	5,724	—	1,026

For fourteen weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	725,801	139,867	865,668
1912....	722,240	72,252	794,501
Increase.	3,552	67,615	71,167
Decrease	—	—	—

Russian Railway Advance to Urga

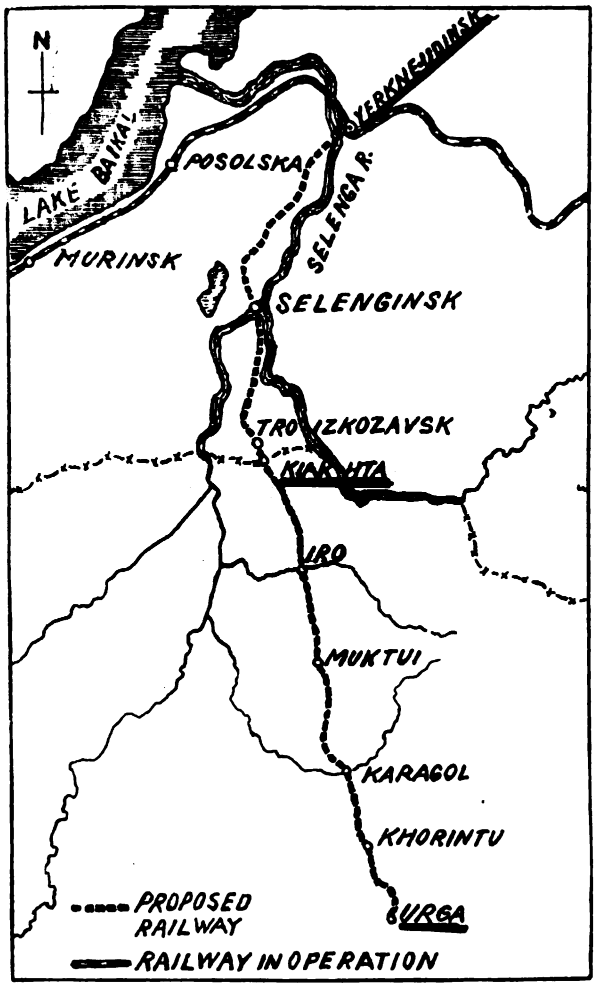
The recent announcement that the Russian Imperial Council had agreed to the building of the Russian States Railway from Yerkne-Udinsk to Kiakhta need cause no surprise. This line has been projected for a long time. It is the natural connection between Mongolia and the Siberian Railway, particularly with the future connection with Urga, the capital of Mongolia, in view.

Yerkne-Udinsk is, as will be seen from the sketch map, herewith, to the east of Lake Baikal, and practically due north of the important trading mart of Kiakhta, which is on the Mongolian frontier, and, in turn, almost due north of Urga.

The line will no doubt be built along the valley of the Selenga River, and then along the main road to Kiakhta.

This, ostensibly, is the furthest that Russians will go, but another line which will, of course, be under Russian dominance, is on the tapis to connect Urga and Kiakhta. An Agreement has been concluded, it is reported, between the Russian and the Mongolian Government, for this line. Nominally the Russians will build the line jointly with the Hutukutu, but in reality all authority will be in the hands of the Russians. One of the stipulations reported to be in the agreement is that the Urga Government will redeem the Railway after 50 years. The Russians have sent surveyors to locate this line, and the work will no doubt be carried out in conjunction with the Yerkne-Udinsk-Kiakhta project.

The following is a gist of the contract made between the Russians and the Living Buddha for the construction of the Urga-Kiachta Railway:—The line shall be built by the Russians; the construction shall begin within six months after the signature of the contract, and be accomplished in two years; the work of the construction shall be after the pattern of the Russian Siberian Railway. The line shall be under the control of the Russians for 50 years, after which period the Urga Government may buy back the line on condition that Urga pays twenty years' interest on the money spent for the construction; the Russians are allowed to operate the mines 50 li within the railway line, and besides the above the Russians shall have the privilege to construct all other lines at the vicinity or north of Urga, but the labourers required for the construction shall be one half Russians and one half Monogolians.



Yunnan-Kueilin Railway

The proposed Yunnan-Kueilin Railway is an important frontier line, and will be highly beneficial as it traverses an area extremely difficult for ordinary travel and transportation.

The line was projected last year, and the gentry and merchants of the three provinces, Yunnan, Kueichow, and Kwangsi, conferred for some time to devise means to carry out the project. At first they proposed that the funds should be raised by the five provinces, Yunnan, Kueichow, Kwangsi, Szechuan and Kwangtung. When the Sextuple Loan was first negotiated, they hoped that they would get an appropriation from the proceeds of the loan when it was concluded. But as the conclusion of the Big Loan seemed doubtful the Yunnan gentry and merchants have been actively urging the people of the three provinces to make a fresh start and make preparations for the realisation of the proposal in earnest, the funds to be raised by the original three provinces instead of the five, as Szechuan and Kwangtung have only a slight interest in the project on account of their geographical position.

A meeting was held by the representatives of the three provinces and they have decided to start a subscription campaign for the funds, and if there is any insufficiency of funds, they will float a foreign loan. They propose to elect Tsen Chun-hsuan (present Director-General of the Hukuang lines) as Director of the Company, and form a coalition with the Szechuan-Hankow-Canton Railway.

Kowloon-Canton Railway

The following estimates of expenditure for the year 1913 for the British Section of the Kowloon-Canton Railway, including the main line and the Fan Ling branch, were submitted to the Hongkong Legislative Council on April 10:—The proposed expenditure for this year, totals $430,068.30 and the savings on total estimate will be $345,881.13. The principal item of expenditure is one of $150,000, which is made up as follow:—Kowloon Station Building $141,402; gang huts $3,028; Taipo Market Station $4,750 and Sheung Shui Station $1,000. This item shows an excess, when added to the expenditure up to December 31, 1912, of $190,000, of $32,995 over the original estimate, which was $310,000. Under the heading of land, it is proposed to spend $5,000, but in this case the savings on the total estimate of $2,669,758.45, amounts to $412,208.99. The saving is due to the land on Lots 618 and 1,140 not being debited to railway account it being decided to acquire K.M.L.'s Nos. 3, 9, 74 and 75. No provision was made in estimate for resumption of land for Fan Ling Branch. Expenditure in 1913 is for strip of land for Manager's House. For C. and W. Rolling Stock it is proposed to spend $132,310.39. Originally only 8 coaches were provided. Since then eight more have been built, and eight are on order. Six more are required for the Fan Ling Branch, not included in the estimate. In connection with this there has been an excess expenditure of $235,939.18 over the original estimate of $309,540.00. Three additional locomotives for the main line, and one for the Fan Ling branch, not included in the estimate, call for an estimate of $57,101.40 increasing the excess of expenditure over estimate to $123,164.63. The total estimate for the railway is $14,060,374.71. To the end of 1912 the expenditure was $13,284,425.28 so that with the present year's estimate the amount spent on the railway will total $13,714,493.58 if the present year's estimate is not exceeded.

The Colonial Secretary in moving that $430,068.30 be advanced stated that substantial additions recently contemplated had brought the capital expenditure up to something like £1,350,000, the extra £250,000 to be raised by a special loan, a Bill providing for which was in the Orders of the Day. The additions to be made would be defrayed out of the loan, the most important being the terminal station on Kowloon Point.

The Lo-tung Railway.—The Ministry of Communications has appointed the Senior Clerk, Chen Yuen-tin, to proceed to Honan to take over charge of the Lo-tung Railway Company.

Tanyang-Ningkuo-fu Railway.—The Tanyang-Ningkuo-fu Railway Company, which was organized by Shanghai capitalists, opened its inauguration meeting recently and Gen. Hsu Kuo-ching was elected Honorary Managing Director. Chang Yao-ching was elected Manager and Kuan Hsiao Assistant Manager. Other officers will be elected at the next meeting, and detail plans to carry out the railway scheme will be formulated.

Nationalization of the Kiangsu Railway.—The attitude of the Kiangsu Railway Company is very favorable to the State-ownership of railways. This Company built the Shanghai-Kashing section of the Shanghai-Hangchow line, and has projected the Kiangpeh Railway, which is to run from Tsingkiangpu to Yangchow.

The negotiations with regard to the nationalization of the projected Tsingkiangpu-Yangchow line have been concluded.

The Kiangsu Railway Company called a meeting recently to consider the nationalization of the Shanghai-Kashing section. The shareholders were quite agreeable as to the handing over of this section to the Government, and they are now discussing the conditions and procedures in regard to the transfer. They will soon send representatives to Peking to confer with the Ministry of Communications on this subject.

Tientsin-Pukow Railway.—An improvement is effected in the service on the Southern section of the Tientsin-Pukow Railway, beginning on May 1, by the addition of a through daily train from Pukow to Tientsin, and *vice versa*, for all classes. A dinner service will be provided but not sleeping cars. The further announcement is made that no third class tickets will in future be issued for the bi-weekly express train except in the case of passengers' servants. The time table appears in our advertising columns.

MANCHURIA

South Manchuria Railway.—In order to guard against emergency, the South Manchuria Railway Co.'s Gas Works are installing a water gas producer ordered from Germany. The installation work will be finished about August.

The S. M. Railway traffic returns for the month of March give Y.2,555,232 and the daily average of Y.82,427, being an increase over the corresponding month of last year by Y.22,769, viz., almost 28%.

The S. M. R. Co., has issued a circular invitation to its shareholders calling upon them to pay in the fourth instalment of Y.40 per share by June 1st. This instalment will supply the Company with Y.4,000,000. When it is paid, the total share capital called up will amount to Y.16,000,000 leaving, only Y.4,000,000 more available for a further call.

The inconvenient location of the Locomotive Shed, Dairen, at the western end of the Dairen Station compound is being brought home to the Railway authorities more forcibly as the locomotives increase in number. Furthermore, the major portion of the buildings is of an improvised character. The Railway authorities have decided to remove it to the old site of the Railway Workshops at the west of the Electric Power House. Work will be commenced in the current year.

Kirin-Changchun Railway.—The Kirin-Changchun Railway proposes to use coal mined from a colliery at Shihlingtzu about 6 miles from Yingchengtzu Station. The management intends to lay a light rail line over the distance, and has finished the surveys. Work was to be started during March.

Light Railway Between Mukden and Jehol.—The proposed construction of the Mukden-Jehol light railway has been approved by the Interprovincial Congress, Peking. An appropriation of $5,000,000 is to be disbursed from the central treasury. Work will be started shortly.

Proposed Branch Line to Kuangning.—The Peking-Mukden Line of the Chinese Government Railways propose to construct a branch line deviating from Chingtatitzu to Kuangning. Some engineers are engaged in the surveys.

SIAM

The Southern Railway.—Railhead on the Siamese Southern Railway has reached Koh Lak. It was expected that trains would be running to the latter place some time in April.

Railway Material.—The m. s. *Jutlandia*, which arrived at Bangkok on March 13, had 3,400 tons of cargo for Bangkok, including transhipment cargo. There were 500 tons of railway materials for Bangkok, and also 220 tons of bridgework for Chumphon, 46 tons of waggon work for Bandon, and 32 tons of waggon work for Singora.

JAPAN

Tokyo Central Railway Station

The Central Railway Station now under construction at Eiraku-cho, Kojimachi, Tokyo, will when completed rob Shimbashi of the honour of being the "front door" of the Japanese capital. The Director of the construction branch of the Japanese Railway Board, Mr. Takeyoro Okada, hopes to have the station ready for general use in June, 1914. Shimbashi will then become merely the freight depot of the Tokaido line.

The following interesting particulars in reference to the new station are taken from the *Japan Times*:—

The site allotted for the purpose is a broad piece of ground facing on the East the moat, bounded in the South and the North by the Kajibashi and the Gofukubashi streets, and on the West, the Yaesu-cho, 65,300 tsubo is the rough calculation of the total area of the grounds. The main building of the station and platforms will occupy the center of this space and the rest of the grounds will have some smaller additional buildings.

There will be eight platforms, all built on the elevated line. Of them two will be reserved for the electric line, and four will be devoted to the Tokaido line, while the other two will be placed at the disposal of the Central Eastern line. The main building will have four entrances in the front, of which one in the center will be used only by the Imperial personages and their suites. Of the remaining three the Southern will be the inlet for the passengers and the Northern the exit for the same while the one adjacent to the Imperial entrance will be the passage for the electric car passengers.

As for the transportation of the passengers' luggage, a special accommodation will be made, so that they can be conveyed from the luggage office on the first floor to the trains on the elevated line or *vice versa*. A post office will be set up at the Western corner of the lot and will be designated for the transaction of metropolitan mail matters which will be sent to various parts of the country.

The foundation of the station is hardened by concrete and the building is constructed of steel. Brick and stone are applied to cover the steel framework and the floor is built of ferro-concrete so that it is fire-proof. The roof is constructed of iron girders and covered by slate and copper plates. The building is 1,104 feet long and from 66 to 132 feet wide, and covers an area of 2,341 tsubo. The height of the building is some 54 feet above the ground in the third-story part and 124 feet in the towers. The first floor will be used as the station. The Southern part of the first floor will be partitioned into many sections which include an octagonal chamber of 354 tsubo allotted for the examination of tickets, two booking offices of 37 tsubo, a first class men passengers' waiting room of 57 tsubo, a first class women passengers' waiting room of 41 tsubo, a second class passengers' waiting room of 79 tsubo, a third class passengers' waiting room of 110 tsubo, two luggage offices of 25 tsubo, a luggage delivery office of 124 tsubo, and two dining rooms of 66 tsubo. A separate building of 95 tsubo will be built just behind and is intended for lavatories for the first, the second and the third class passengers, as well as public telegraph and telephone rooms. In the Northern part there will be made an octagonal chamber of 315 tsubo intended for the examination of tickets of the alighting passengers, a waiting room of 64 tsubo, a women's waiting room of 64 tsubo, a women's lavatory of 9 tsubo, a luggage delivery office of 122 tsubo, two luggage offices of 25 tsubo. A separate building will also be built on this side just behind these rooms. The central part will be reserved for use of the Imperial family, and will cover an area of 275 tsubo, which is divided into a resting hall of 27 tsubo, an adjoining room of 7 tsubo, a hall of 30 tsubo, two waiting rooms of 61 tsubo, an entrance and an open porch of 36 tsubo, and a passage leading to the plaform of 114 tsubo.

There is a basement, the Southern end of which will be used as cooking quarters, a goods depository and a general washing place; and the Northern end as an engine room equipped with a steam heating system. The rest will be occupied by a large dining hall where the Railway people can meet. All the food cooked here will be conveyed to the first floor and upwards by elevators.

The second and the third floors will be used as business quarters and dining halls. As for stairways, those leading to the third floor from the first are seven, of which two are situated near the central part. There is only one stairway which leads to the second floor from the first and two which lead from the second floor to the third. Throughout the building electricity will be laid on.

In view of the completion of the station the price of land in the neighborhood has risen considerably. The city has a plan to construct a road of 240 feet wide before the station and a road of 90 feet wide extending from the City Office to the Gofukubashi. It also expects to reconstruct the Kajibashi and the Gofukubashi, the two most important bridges connecting the new station and the bustling business quarters. The bridges, when completed, will give a beautiful effect and may equal representative bridges in the West.

Railway Returns.—The total value of returns from the Government's railway business for the fiscal year ending with March 31st was 105,318,027 yen with an increase of 7,537,353 yen against the previous fiscal year. The average working mileage was 5,130 miles. According to the authorities concerned, when the revenue from miscellaneous and some other sources is added, the grand total will exceed by 5,000,000 yen or 6,000,000 yen against the estimate of 104,700,000 yen for the said fiscal year and by 9,000,000 yen or 10,000,000 yen against the budget for the current fiscal year, and the net profit will increase after all by about 7,000,000 yen against 10,107,000 yen as estimated for the last year.

Investment in Light Railways.—Since the existing Light Railway Law was enacted, 219 companies have been established for the construction of light railways, the total length reaching 3,033 miles and the capital invested therein amounting to 147,080,000 yen in all. The figures include the five companies sanctioned during the month of March, with the total amount of capital of 5,750,000 yen.

Electrification of Short Railways.—The electrification of the shorter railways seems to be proceeding apace in all countries, and the Japanese Railway Board is not going to be behind in the fashion. At Yaguchi, near Kawasaki, a large power-house is already completed and when transformers, &c., are ready, electric trains are to be run between Yokohama and Tokyo at much more frequent intervals than the present train service provides.

New Station at Osaka.—At an expenditure of about Y.9,000,000 the Japanese Railway Board is now reconstructing the Osaka station. The chief points in the plan for reconstruction are the separation of the passenger and goods traffic and the improvement of the accommodation for passenger traffic. Though the work will not probably progess as quickly as at first expected, owing to lack of funds, it will be completed by 1917 or 1918 at the latest.

State Railways Debt Heavy.—The outstanding amount of public loans raised on account of the State railways is given as 591,270,750 yen, the figures being composed of 456,195,000 yen of the railway nationalisation loan, 61,151,450 of the railway bonds, 25,378,750 of the railway undertakings loan, 20,392,150 of of the railway loan adjustment loan, 21,901,100 of the consolidation bonds, and 6,251,300 of the

Hokkaido Railway bonds. Adding to this sum the newly raised foreign loan of 40,000,000 yen, the total is 631,270,750 yen. Again, adding the short-term loans and railway bonds the total debt of the State railways will exceed 820,000,000 yen.

New Railway Lines.—The Shingu Railway, a private line between Shingu and Katsuura, near Kumano, Kii Province, has been completed. The line was formally opened to traffic with appropriate ceremonies.

Proposed Reduction of Staff—The *Jiji* notes that the staff of the Japanese Government railways will be reduced as the result of the proposed reform of the management, and the authorities are now considering to what extent they can carry the reduction. The railway staff now stands at 108,000 in round figures. If the number is reduced by 10 per cent., 10,800 men can be dismissed, and the amount of salary so saved will be about Y.3,000,000. No reduction will be made in the outdoor staff.

New Cars Ordered.—The Japanese Railway Board it is said will order abroad railway cars 1,500,000 yen worth in the next fiscal year. The Board used to buy cars 2,500,000 yen worth abroad each fiscal year, but the amount was cut off this year partly owing to the increase of constructive capacity in the domestic factories and partly due to the postponement of enterprises in the next fiscal year.

THE PHILIPPINES

Manila Railroad Co.—Twenty-five coaches and fourteen locomotives represent one order for new equipment for the Manila Railroad Co. A train de luxe superior to anything in the Far Fast for comfort and luxuriance with the possible exception of the International Express over the trans-Siberian route, will be in operation over the Manila Railroad Company's system shortly. The train will comprise a palatial combination sleeping, observation and buffet coach, combination sleeping and day coach and heavy third class cars of the same external dimensions, each with a vestibule at both ends, connecting up the entire train like the trans-continental fliers in America. The Manila Railroad Company is adding twenty-five new cars to their rolling stock, in addition to two combination coaches. Already eight of the new third class cars, and ten new locomotives have arrived, The American Locomotive Works in the states turned out the engines and the cars are the product of the Metropolitan Amalgamated and Finance Company of Birmingham, England.

The new combination coaches will be sixty-five feet in length and divided into seven compartments with a bath room at either end. Each compartment will be equipped with two berths and a sofa, electric ligths and fans and will be handsomely decorated and upholstered. The observation section at the end will be cosily furnished and the buffet will be an alluring attraction.

The ordinary third class cars will be 52 feet long, but three of these which will form a part of the train de luxe will be the full 65 feet and of the most substantial construction.

BURMA

Burma-Yunnan Railway.—An Indian railway journal says:—The French have been active in pushing on railway construction on the other side of Burma and the linking up of Laokay with Yunnan-fu is completed. The Yunnan Railway took eight years to build and cost three lakhs and a half per mile. It is, of course, primarily of strategic value but is calculated to be a paying concern in 20 years. It is stated that our Railway Board will shortly take up the question of building a railway between Burma and the Chinese frontier. It is, however, doubtful if an isolated railway link between Burma and the Chinese frontier will meet the demands of trade. It will probably be found that a railway between Burma and India is also required to promote trade and protect our interests effectively on the Chinese frontier. There may be no immediate returns from the undertaking, but in the long run, it will prove of as great a value as the Yunnan Railway.

MALAYA

Federated Malay States Railways.—Passenger stock on the F. M. S. Railways is being rapidly augmented, and four complete new mail trains, each consisting of engine and 6 or 7 coaches, were recently added. The first of these new trains consisted of a new engine of the standard "H" type, but with several minor improvements. There were also seven coaches, very much on the old lines, but showing several improvements, notably the elliptical roof to each coach, with Lincrusta roofing, the oak furnishing to the first class coach, which has no upper bunks, and the addition of upper bunks to the third class. The seven coaches were: Restaurant car, first class coach, second class, two third class, and two luggage coaches with additional third class accommodation. The first and second class coaches have been built by the Birmingham Carriage and Wagon Company, sent out in parts, and erected at the Central Workshops. The third class and luggage coaches have been built entirely at the Workshops. The engines were also erected there.

Experiments are being made at the Central Workshops with regard to the new "motor trains" which are to be introduced and three of which, it is expected, will be ready at the end of the year. An experimental coach is now being tested. The new motor trains, of which eventually sixteen will be built, will consist of a coach containing the engine of the vertical boiler type, and accommodation for eight first-class, 24 second-class and 36 third-class passengers, together with a trailer coach with seating capacity for 64 passengers, and a driving compartment at the iend The train can thus be driven from ether. end. Final parts for the first three trains are expected to arrive in November.

CHOSEN (KOREA)

Better Railway Service.—A Seoul report says that the Chosen Railway Board has decided to run a night train, consisting of 1st, 2nd, and 3rd. class cars, on the Seoul-Wiju Line, by extending to Antunghsien the service of the present Fusan train, which daily leaves Fusan at 10.30 a.m. and stops at the South Great Gate, being due there at 9.30 a.m. The train, if run to Antunghsien, will connect with the South Manchurian train for Mukden, leaving Antunghsien in the morning.

In the event the plan is carried out, the passengers from Japan to Siberia or Dairen can make a through passage to Mukden without having to break the journey at Seoul and Antunghsien for the night, as at present. Moreover, they could take the South Manchurian night trains, Northward or Southward, at Mukden to continue their journey without losing much time at Mukden. Likewise, passengers from China or Europe, on the South Manchurian cars from Changchun or Dairen could enjoy similar facilities by taking the day train from Mukden for Antunghsien, the night train from Wiju to Seoul, and the day train from Seoul for Fusan, which would all be brought into through connection by the new program. In fact, the opening of the night train on the Seoul-Wiju line would effect a through-train service both ways between Tokyo and Mukden, and the benefit to the travelers between the two places would be very considerable. The program was to put into practice on May 1.

TRAMWAYS

Shanghai Tramways

The returns of the Shanghai Tramways (Foreign Settlement) for three months ended March 31, 1913, are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 201,794.00	$ 182,320,85
Passengees carried ..	9,992,856	9,069,133
Car miles run..	648,747	667,481

The loss by exchange of subsidiary coinage for the period was $53,464,29, equal to 22.31 per cent. of the gross cash collected on the cars as compared with $54,759.69, equal to 24.73 per cent. for the corresponding period last year.

The returns for the week ended March 26 are as under:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 15,623.23	$ 13,049.39
Passengers carried ..	792,783	656,212
Car miles run	49,274	50,251

The loss by exchange of subsidiary coinage for the week was equal to 23.61 per cent. of the gross cash collected on the cars as compared with 24.86 per cent. for the corresponding week last year.

Week ended April 2, 1913:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 15,470.40	$ 13,380.43
Passengers carried ..	782,940	669,889
Car miles run	49,375	50,128

The loss by exchange of subsidiary coinage for the week was equal to 23.60 per cent. of the gross cash collected on the cars as compared with 24.86 per cent. for the corresponding week last year.

Week ended April 9, 1913:—

	1913.	1912.
Effective receipts (after deducting loss by exchange)	$ 16,498.28	$ 14,893.07
Passengers carried ..	825,361	745,996
Car miles run..	49,840	51,001

The loss by exchange of subsidiary coinage for the week was equal to 23.24 per cent. of the gross cash collected on the cars as compared with 25.15 per cent. for the corresponding week last year.

Week ended April 16, 1913:—

	1913. $	1912. $
Effective receipts (after deducting loss by exchange)	17,203.86	15,761.48
Passengers carried	847,762	707,426
Car miles run	51,766	52,310

The loss by exchange of subsidiary coinage for the week was equal to 23.28 per cent. of the gross cash collected on the cars as compared with 25.30 per cent. for the corresponding week last year.

Hyogo Electric Railway Co.—The Hyogo Tramway Co. (Japan) has decided to extend its lines at the cost of 2,000,000 yen, but whether it will be effected by increasing the capital or raising a loan is not yet settled.

Nada Junkwan Electric Tramway.—The plans of the Nada Junkwan (Japan) Electric Tramway Company, which recently obtained a charter to construct an electric tramway from Kumochi, Kobe, to Nishinomiya, skirting the foot of the hills, seem to have experienced a check. The promoters have failed in their negotiations for the incorporation of their company with the Hanshin Co., and are now trying to incorporate with the Mino-Arima

Electric Tramway. The *Osaka Mainichi* says that the route of the new line is being surveyed, but the payment on shares being rather unsatisfactory, further preparations for the formation of the company are delayed. The promoters, however, are determined to dispose of the unpaid shares by the end of May and then hold the inaugural meeting.

The Nantao (Shanghai) Tramway.—The construction of the tramway in Nantao, says the Chinese Press, is being pushed on very rapidly day and night, and rails have been laid as far as Tungkadoo. But the existing bridges across Sikapang and Lokapang and before the Kaitai Timber Hong are too weak to bear the strain of a tramcar running over them, and they have to be replaced by bridges with steel rails and a hard wood body. The whole tramcar service is to be completely constructed by the end of May so as to enable the Company to run cars before the Chinese dragon festival. After the traffic of the above section is opened, work on the section from the Shanghai-Hangchow Railway Station to Kiaochangmiao (near the Arsenal) will be taken in hand. As to the track around the City moat, work will not be started until the Huatsaopang Creek inside the City has been filled up. The cars and motors have arrived in Shanghai and have been conveyed to the Chiu Sing Factory, of Nantao, who are to fit the cars up and complete them. One car is being fitted up first for the purpose of testing the rails already laid. The managers of both the British and French Tramcar Companies have inspected the work and expressed their satisfaction with their manner of construction.

MINING

Fushun Coal.—The Imperial Government Railways of Japan have placed an order for about 150,000 tons of Fushun Coal for the present year. The aggregate annual consumption by the whole of the service is put at about 1,200,000 tons a year, and Fushun Coal now comes in for the supply of one-eighth of the total consumption. The appearance of Fushun Coal on the field at home little disconcerts the suppliers of home coals. Such is stated to be the case by a good authority, who ascribes it to the rapid growth of industrial enterprises all over Japan. The demand for coal is rising year by year, and the import of Fushun Coal in considerable quantities is no longer looked upon as a trespass upon the legitimate market for home coals.

Zinc in Korea.—The Belgian Consul at Seoul states that the mining industry of Korea, which includes gold, copper, iron, lead, silver, graphite, and coal, has received a further impetus by reason of the recent discovery of zinc deposits in the mountainous country around Yen Ben, Province of Pyeng Yang. A concession for the working of these deposits has been secured by a Japanese company, and the extraction of zinc has already begun. It appears that during September (the first month of working) 1,000 tons of ore were obtained. Unfortunately the mines are situated in places not easily accessible, and the cost price of the mineral delivered at works is consequently enhanced. Road construction is, however, being actively proceeded with, and it is anticipated that improved transport facilities will eventually greatly stimulate this and other mining industries in Korea.

Gold near Manila.—Gold has been discovered on the banks of the Mariquina river within fifteen miles of Manila.

Colliery at Huashihling.—There is a colliery at Huashihling to the northeast of Changchun. The coal seam is said to be 15 feet thick. At present about 20,000 *kin* is put out daily. With the use of modern machinery the daily output may easily be increased about four-fold. The Chinese Tax-Collector at Changchun resigned his office recently to assume management of the colliery. He has paid Taels 50,000 to the concessionaire as the price of the concession, and is said to have another Taels 50,000 at command for investment in the colliery.

Kailan Mining Administration.—The total output of the Administration's mines for the week ending March 22, amounted to 38,656.38 tons and the sales during the same period 44,685.65 tons.

Week ending March 29, 39,686.56 tons and sales during the same period 40,351.60 tons.

Week ending April 5, 1913, 39,931.87 tons and the sales during the same period 40,404.63 tons.

Week ending 12th April, 36,101.17 tons, and the sales during the same period 50,597.16 tons.

Maliguit Dredging Co.—This Company has been incorporated at P.1,000,000 to take over from Mr. A. J. MacDonald 480 acres of placer claims on the Maliguit River, P.I. It is reported that the dredge now on the ground saves 200 ounces of gold monthly from the placer workings. The incorporation of this company means that more dredges will be immediately installed in the Camarines to work the claims and great results are expected in the very near future.

New Shafts at Takashima Collieries.—Two shafts have been sunk on Shimoputago islet, Japan, the work marking an important development of the Takashima Collieries, which are owned by the Mitsu Bishi Company. It is estimated that 34,000 tons of coal will be obtained from the new shafts this year and that a monthly output of 30,000 tons will be possible when the preparatory work is complete. The colliery will be known as Futagoshima. The coal field tapped by the shafts is called Nakanoshima and contains, according to experts, 11,520,000 tons of coal. The yield is estimated to last 34 years. Another coal field lies between Nakanoshima and Takashima and will be reached in the near future. Its area is far greater than the dimensions quoted above and seventy years are estimated as necessary to exhaust the store of both fields. The daily outputs of Takashima and Hashima mines, which up to now have supplied all the famous Takashima coal, are about 300 tons and 500 tons, respectively.

LUMBER

New Mill for Dumanguilas.—A saw mill with a capacity of 125,000 board feet a day has been ordered from the American Trading Co. by Rafael Machuca Go-Tauco, owner of the Manila Saw Mill on calle Soler, who recently secured one of the finest timber concessions in the island of Mindanao. The boilers and engines ordered will be capable of developing 450 horse power. The mill will be located on Dumanguilas bay, on the southwest coast of Mindanao, where the concession is located. It is expected to have the mill running by July. Work has already begun on the construction of houses and wharf and all will be ready when the mill is delivered a few months hence. The wharf which is now being built will project 300 meters from the shore and be T shaped, the extension at the end being 50 meters long. This extension will be capable of stocking 400,000 feet of sawed lumber, and will allow vessels drawing up to 30 feet of water to come alongside and load. The extensive Go-Tauco concessions, nearly 24,000 hectares, extend along the coast of Dumanguilas Bay for a distance of five hours' travel by water. Most of the cutting will be done close to the shore and the timber floated to the mill in rafts, where the logs will be handled by two cable hauls 2,000 and 3,000 feet long respectively. The principal woods to be found on the concession are yacal, guijo, lumayao, the last known for its great water resisting qualities, being even barnacle proof, it is said, and bangachapuy, which is an excellent deck building lumber.

SUGAR

New Centrals for the Philippines.—Two new sugar centrals were to be constructed in March, the Ronas central for the Nasugbu estate, and the second one for the Lizarraga hacienda in Negros. Both orders are eleven roller mills (hydraulic gear top rollers), built by John McNeil and Company, and represented at Manila by Messrs. Fred Wilson and Company. Each mill represents an outlay of 500,000 pesos, and will have a crushing capacity of 250 tons of cane in 24 hours.

DOCKS, ETC.

Dairen Dockyard.—The Dairen Dockyard, which belongs to the Kawasaki Shipbuilding Company, commenced the work of extension early in April, the growth of the port requiring greater accommodation. Since the year before last the number of ships wishing to use the dock has been on the increase. The present dockyard, being just as it was left by the Russians, is not suitable to meet the demand. It is too small and narrow at the entrance compared to its length and it is almost impossible for large ships to enter. Extension work was decided to be done by the department of harbor improvement of the South Manchuria Railway Co. The dock at the narrowest part of 47 feet will be widened to 55. The length, which is 288 feet, will not be changed. After the completion of the work, which is expected to be in October, it is stated that a ship of 5,000 tons gross will be able to enter without difficulty.

LIGHT AND POWER

Water Power Industry in Japan.—Hydro-electric power industry has made a great advance in Japan in recent years, and its status at the end of last year was 383 enterprises and 2,172,891 H.P. The following figures as prepared by the authorities concerned show how this branch of industry has grown up in Japan in the last ten years:—

	Number of enterprises	H.P.
1903	87	148,846
1904	93	238,633
1905	102	285,393
1906	180	1,168,991
1907	244	1,816,642
1908	262	1,872,348
1909	284	1,917,901
1910	321	2,005,438
1911	265	2,075,575
1912	383	2,172,891

Fatshan Electric and Power Co.—The contract for the supply of all the generating plant for the new station of the Fatshan Electric and Power Company has been secured by the Hongkong branch of the General Electric Co., of China, Ltd. The contract includes three high tension alternators three phase, to be driven by Bolinder crude oil engines, also a 14 panel control and distribution switchboard. All the electrical plant will be manufactured at the G. E. C. Works at Witton, Birmingham, and is expected to arrive towards the middle of the year.

Tiehling Electric Light Co.—The business returns of the Tiehling Electric Light Company, under joint management of Japanese and Chinese, for the latter half of 1912 are as follow:—

Net profit	Y. 5,202
Disposed of as follows:—	
Reserve fund	1,500
Dividend to shareholders	3,006
Bonus to officers	520
Carried forward to the next term	176

INDUSTRIAL

Messrs. Lever Brothers and the Soap Industry in Japan.—The *Asahi* notes that the largest soap factories in Japan are the Hagiwara and Haruki soap works in Osaka, all the others being conducted on a small scale. The new soap factory established at Amagasaki by Messrs. Lever Brothers is equipped with a capital of Y.3,000,000, and in excellence of machinery and completeness of arrangements the factory has no equal in Japan. The machinery can extract oil from beancake with perfect ease, which no other Japanese soap factory can do. For this reason, the opening of operations recently by the Lever Brothers' factory at Amagasaki has created a panic among the Japanese soap manufacturers, as in the event of the British factory taking a competitive attitude, the smaller Japanese manufacturers will be gradually ruined. But the Japanese manufacturers, notwithstanding that trepidation, are optimistic regarding their position. They maintain that the process of the manufacture of soap is quite simple, as a small quantity can be manufactured with only one pan, and a larger quantity with more pans. When Messrs. Lever Bros. slacken their hands a little in competition, the numberless small manufacturers will arise "like bamboo shoots after rain in early summer." Moreover, however, strenuous may be the efforts of the British factory, it is difficult to change the taste of consumers. In these circumstances, powerful as Messrs. Lever Brothers' factory may be, it cannot suppress entirely the smaller Japanese soap manufacturers.

The Asahi Glass Manufacturing Co.—The Asahi Glass Manufacturing Company at Amagasaki is reported to have decided to extend its plant and will purchase 20,000 tsubo of land for the new factory buildings. The cost of the extension is estimated at about Y.2,000,000. This company is conducted in the interest of the Mitsu Bishi. The *Asahi* notes that the company is now turning out glass of pretty good quality, but owing to a deficiency in the skill of the artisans, the company has not yet made much profit, as the expenses are very heavy. A year or two ago Mr. Yamada, the engineer of the company, travelled in Europe and America, together with Mr. Iwasaki, president of the company, for the inspection of the industry of glass manufacture. Since their return in October last from the tour, they have been considering a scheme for the extension of the works, holding that only by a larger outlay can the business be made to pay.

Tiehling Flour Mill.—The branch factory of the Tiehling Flour Mill has had its machinery practically installed. This new factory will have a capacity daily of 2,400 sacks (50 lbs. each) of flour. The floor area of the factory is 125 *tsubo*. There are four granaries capable of storing 30,000 *koku* of wheat. Three of them have already been well filled, and the Company's agents are actively buying wheat about Nungan, Shuangchengpu, Shihtoucheng-tzu, Harbin, etc. When this branch factory is put in full working order, the Company's daily output will be increased to 900 *koku*.

SHIP-BUILDING, ETC.

New Pontoon Hulk.—The Shanghai Dock & Engineering Co., Ltd. recently successfully launched from their Pootung Works the largest steel pontoon hulk built on the China coast. The hulk is 384ft. long, 45 ft. wide with a moulded depth of 12ft. and has been built to the order of the Ocean Steamship Co., Ltd. The vessel is the first of its kind constructed in the Far East on the "Isherwood" principle, a new principle adopted for all kinds of ships and which lends itself particularly well for the construction of large cargo pontoons. She has a carrying capacity of about 3,500 tons deadweight on 10ft. draft and was towed up-river to Hankow, where she will serve as a depôt for the cargo of the Blue Funnel steamers. The hulk was finished well within contract time in spite of the delay caused by wet weather. The construction was superintended, on behalf of the owners, by Captain Nelson and Captain Dewar of Messrs. Butterfield & Swire.

New Nippon Yusen Kaisha Liner.—The Katori Maru, the largest vessel yet built for the Nippon Yusen Kaisha, was successfully launched on March 30, from the slips at Tategami of the Mitsu Bishi Dockyard and Engine Works. The steamer has been built under the supervision of the Surveyors of Lloyd's Register of Shipping, by whom she will be classed 100 A 1, and according to Japanese Government requirements. Her dimensions, etc., are as follow:—

Length	490	feet.
Breadth	61	"
Depth	36½	"
Draught (maximum)	28.11	"
Gross tonnage	10,600	tons.
Displacement	19,500	"
Horse Power	10,000	
Speed	16¼	knots.

She will be fitted with six cylindrical boilers and a combination of Parson's turbine and reciprocating engines. She will have three screws. The engines are designed to economise steam-power and coal.

The Katori Maru has been built for the Nippon Yusen Kaisha's European service and is designed for passenger and freight traffic. She is double-bottomed throughout and is divided by eight bulkheads.

Wireless telegraphy, fire extinguishing, disinfecting, and refrigerating apparatus, all of latest pattern, will be installed. Electricity will be used throughout for lighting purposes and electric fans will be provided on a generous scale for the comfort of passengers.

Accommodation is to be prepared for 112 first class, 56 second-class, ten special third class, and 178 steerage passengers. The first class cabins will be single, double, and four-berth and the second class will be double and four-berth. Dining, smoking and lounge saloons will be in accordance with the most modern ideas, special saloon accommodation will be provided for children, and a swimming tank will be among the provisions made for recreation. Fourteen life-boats, more than sufficient to accommodate all the passengers and crew, are to be carried.

Cargo capacity consists of six holds, equal to 12,000 tons, and the bunkers will take 2,000 tons of coal. A forty-ton and twelve smaller cranes will be fitted.

FINANCIAL

Bank of the Philippines.—The following is the report presented to the stockholders of the Bank of the Philippines by the president Mr. Jno. S. Hord:—

The directors submit to you herewith a general statement of the affairs of the bank, balance sheet and an extract of the profit and loss account for the 60th year ended December 28, 1912, payment of a dividend of 10% having been declared. The capital stock of the bank subscribed and paid in on January 8, 1912, was P.4,096,200.00 with a legal reserve of P.987,-381.58 making a total of P.5,083,581.58. On April 8, 1912, when the last installment of the new stock subscribed had been paid in, the total paid-in capital was P.4,500,000.00, with a legal reserve of P.1,125,000.00, making a total of P.5,625,000.00.

A number of the stockholders of the bank, who had time or current deposits in the bank, withdrew portions of such deposits and applied considerable sums towards the payment of their new stock subscriptions between January and April, 1912. It is therefore apparent that certain portions of the bank's working capital which were available in 1911 and years prior thereto, represented by such current and time deposits as were withdrawn between January and April, 1912, aforesaid, were no longer available as working capital during most of the year 1912. This fact is here explained in order that the mistake may not be made of adding to the bank's new capital stock the total of time and current account deposits existing in previous years, because to do so would be to form an erroneous estimate of the total of the bank's working capital during last year as compared with previous years.

In common with many other commercial and industrial institutions in these islands, the bank's interests have been adversely affected during most of the year 1912 by the serious money stringency, which was felt in all lines of trade. The two main contributing causes for this money stringency were, 1st:—the enormous sums amounting to over P.20,000,-000.00 which were sent abroad to pay for rice importations into the islands during the entire year 1912, and, 2nd:—the low price paid for the sugar crop of these islands in the United States as compared with the prices paid during the three years preceding. The rice shortage within the islands was caused by the severe drouth we experienced, unprecedented during thirty years. The low price paid for our sugars abroad was caused, in part, by abnormally large crops in other countries, and, in part, by political agitation in the United States for a reduction by the American congress of the import duty on sugar entering into that country. During the last six or eight months of 1912 the American importers were not buying Philippine sugars for shipment from here and such sales as were consummated during those months were practically all sugars shipped on consignment and awaiting a purchaser in some city on the Atlantic seaboard. Some sales were made of sugars afloat, but these were only within a few days of the arrival of the cargo in port. In other words, the sugar importers in the United States so feared some radical reduction of the tariff rates on sugar entering that country that they were unwilling to risk a danger of loss should they purchase sugar stocks in these islands, delivery of which on the Atlantic seaboard would necessarily be some two or three months subsequent to the date of purchase.

Many other setbacks which the commerce of these islands had during 1912, serious enough in themselves, but still of minor importance compared to the two causes mentioned above, may be enumerated, such as several disastrous typhoons, locusts, a tendency to speculations on the part of some of those interested in the sugar and other crops and the tobacco workers' strike. These additional causes for commercial depression served to further aggravate the money stringency throughout the islands. The importers of Manila and other of our larger cities, found themselves over-stocked with goods, which, because of the general lack of money, they were unable to sell for cash and feared to sell on credit. They found it an increasingly difficult task to collect from their clients moneys due for past credit transactions. Many of these importers are clients of this bank, and their loans and overdraft account increased, in most cases, considerably above the normal figures in previous years. We have, fortunately, been able to attend to the legitimate needs of these clients and to prevent, to that extent, anything in the nature of a panic.

With the end of the drouth, and bountiful rice crops now being harvested throughout the islands, the prospect since the first of this year has been much brighter. However, it will be several months yet before money conditions within the islands will have returned to a normal level. The large sums withdrawn from the islands for the purchase of rice abroad will have to be replaced during the slow process of the coming months by the increase of our exports. Were our present sugar crop good in quality and large in quantity, our money deficiency would be sooner replenished, but, unfortunately, the fact is quite the reverse and the outlook for our sugars commanding a

good price abroad during this year is anything but promising. The tariff agitation for the reduction of custom duties on sugar entering the United States still continues with greater probability than ever before of its becoming an accomplished fact in the near future. The latest reports received from the United States regarding cane sugar from Cuba and beet sugar from Germany are that not within the history of sugar production have there been such bumper crops as will be marketed from those two countries during 1913. The outlook at present is that a very large percentage of the Philippine sugar during 1913 will remain unsold, unless, as was done last year with a considerable portion of the stock, it is sold in Japan and China at the comparatively low prices obtaining in those countries.

Hongkong and Shanghai Banking Corporation.—At the ninety-fifth ordinary half-yearly general meeting of the shareholders of the Hongkong and Shanghai Banking Corporation. Mr. E. Shellim (Chairman) presided and after having referred in detail to the annual report and balance sheet (which have already been published in the FAR EASTERN REVIEW) continued: During the past year trade throughout the world has been very active, with a consequent good demand for money, and we have found ample opportunity for the employment of our resources.

Indian trade continues in a highly flourishing condition and the country is attracting such large quantities of gold that it is evident India is becoming a factor of ever increasing importance in the Gold markets of the world. India was also an important factor in the Silver market, the heavy withdrawals of rupees from the Treasuries making it necessary for the Government to become purchasers of silver, and during the year they bought some £6,000,000 of that metal for coinage purposes, being the equivalent of about Rs. 13¾ crores of coined rupees. The total reserves of silver coin at the end of the year including silver in the gold standard reserve, in the mint and on the way, were about Rs. 20 crores against Rs. 25 crores on the 31st December 1911. A continuance of withdrawals on anything like the scale of last year will probably lead to further purchases of silver by the Indian Government.

In connection with India you will doubtless expect me to make a brief reference to the Opium Question, as it is one of great importance to that country and equally so to all connected with the trade. The agreement of 1911 between Great Britain and China and the manner in which it has been carried out by the latter have been so generally discussed that I need not enlarge on the matter, more especially as the whole position is, we understand, the subject of diplomatic negotiations. The Indian Government, however, have realised the seriousness of the situation by their action in giving notice of their intention to discontinue, after three months, the sale of certificated opium for the China market, and by imposing a high upset price on opium to be sold at the three auctions before sales cease.

While fully sympathising with China in her efforts to suppress opium smoking, the fact should not be lost sight of that a certain period was arranged by China in which to attain that object, therefore those who entered into commitments on the good faith of the agreement being effective have reasonable cause for complaint at the present situation. I cannot but feel that an equitable arrangement will be arrived at whereby an outlet may be found for present stocks, which, on the basis of past years, only represent about nine months' comsumption in China. It would hardly seem just that those who purchased opium from the Indian Government on the strength of the agreement should suffer through that agreement being ineffective.

So far as this Bank is concerned it, in common with other Eastern Exchange Banks is interested in the financing of the business, as it has been since its foundation, but our present interest in not unduly large under the circumstances and the advances are to firms of good standing and show satisfactory margins on present quotations.

I shall not on this occasion refer in detail to all the countries where the Bank is established. Reports show they have participated in the general trade activity and advices from all places point to favourable conditions for the present year.

I am pleased to say that in Siam and Cochin-China, where rice harvests have been very indifferent for the past few years, full crops are practically assured this season.

As regards Hongkong and South China, trade proved far better than the outlook at the beginning of the year led us to expect. The Canton Silk crop did not perhaps come quite up to anticipations and the trade was handicapped by the war in the Balkans, but I believe, taking it all round, merchants have not done badly.

Import business, assisted by a favourable exchange, has been fairly prosperous notwithstanding the disturbed state of the neighbouring Provinces. Local industries appear to be in a healthy condition and have been attracting money from *bona fide* investors —always a welcome sign of confidence in the future.

In the Yangtsze Valley and the Northern Provinces, excellent crops, and favourable conditions in the foreign markets, made the period under review a very satisfactory one, in spite of the political unrest and consequent monetary difficulties. The accumulations of imports at the Treaty ports, which necessarily took place during the serious disturbances in 1911, have, owing to the rise in exchange and advance in the price of Cotton and other foreign commodities gone into consumption freely on profitable terms, and I think the position as regards imports may be considered sound. With regard to exports the enquiry for most of the staple articles continued unabated, notwithstanding the higher exchange, so it is evident that there is a steadily increasing demand for Chinese produce in foreign markets, and, given settled conditions, the further development of China's trade can be confidently looked for.

In this connection I cannot do better than quote the following from a recent market report of Messrs. Ilbert and Co., Shanghai, which I think aptly describes the situation:— "The extraordinary vitality of trade which the country can show after a period of so great political and monetary stress as that through which it has passed augurs well for the future development of commerce in China, even if only a moiety of the principles of reform and progress which are mooted, ever become genuinely established."

When addressing you in August last, I referred to the loan negotiations between the Sextuple Group and the Chinese Government, which were at that time suspended owing to the difficulty found by the latter in agreeing to conditions of security and expenditure considered indispensable by the Groups and their Governments but opposed by the sentiment of an influential section of the Chinese public. Shortly afterwards the Chinese Government concluded a loan with other parties, under conditions which dispensed with the guarantees demanded by the Groups and in circumstances with which the discussions in the Press have made you familiar.

The subsequent resumption of negotiations between the Groups and China and a frank discussion of mutual difficulties have, I am happy to believe, led to the removal of much misunderstanding on both sides. The terms of a final Agreement have now been satisfactorily arranged and its conclusion waits only the decision of the question, to be settled between China and the Governments concerned, of the engagement of foreigners for the advisory and executive posts contemplated under the loan Agreement. When this matter has been finally settled, as I trust it will be, a sum of about £26,000,000 will be placed at the disposal of China for the reorganisation of her finances under guarantees of security and expenditure which have the full approval of the Governments concerned.

I may mention that the British representation in the Sextuple Group has recently been extended by the association with ourselves of the great issuing houses of Messrs. Baring Bros, and Co. and Messrs. J. Henry Schroder and Co; our London Bankers; The London County and Westminster Bank; and Parr's Bank, with whom we have been closely allied in the issue of Japanese Loans.

In conclusion, Gentlemen, I should like to endorse the confidence expressed by my predecessor in the chair a year ago with regard to the future of China. I think we may safely trust to China's industrious population and great natural resources as a sufficient guarantee of prosperity. Troubles and difficulties inevitably follow great political changes and it may be some time yet before the machinery of Government is in proper working order, but that will come, and with it the development and reform for which there seems to be a really genuine desire. The present Chinese Government has already given reassuring indications of its determination to introduce thorough reforms into its financial administration, and I feel sure all will unite with me in the sincere hope that the wise application of all money obtained will result in a restoration of credit and confidence and an increase of commercial and industrial activity to the benefit of China and all nations interested in Far Eastern trade.

Yokohama Specie Bank.—The sixty-sixth general meeting of the Yokohama Specie Bank was held on March 10. President Dr. Mizumachi made a speech dwelling on the economic situation and business condition during the second half of last year, the gist of which is as follows:—

The economic situation in Japan during the second half of last year was somewhat depressed, being affected by the adverse trend of foreign trade since spring, a stringent money market, and the high price of commodities. On the other hand, the export trade in raw silk presented activity during the period, owing to the increase of shipments and the advance in prices. The restoration of order in China and the appreciation of the price of silver combined to enhance the export to China of cotton and cotton manufactures and sundry goods. The activity in business enterprise during the first half of the year showed no sign of declining in the second, the total amount of investment reaching about 200,000,000 yen. Again, the rice crop was better than in the normal year, notwithstanding damages from the storms in August and September. This favorable rice crop combined with the high price of rice increased the buying power of the agricultural classes, the consequence being a brisk movement of commodities in the local market. In fine, the general situation of the economic world was quiet on the whole, and showed signs of gradually making a sound development.

The situation of the money market, which began to present signs of growing stringency toward the close of 1911, maintained a similar situation with futher upward tendency. This was, in part, owing to the increase of demand for the account settlement of imported articles, instalment of capital in newly started business, and the laying in of winter stocks. But what mainly accounted for the tight money situation was the precaution exercised by banking circles who were excessively cautious in anticipation of the prospective advance of the money rate and economic inactivity in view of the clamor for financial retrenchment and contraction of convertible notes. Under the circumstances the rate of discount of the Exchequer bonds was repeatedly raised each time when they were rewritten, finally being increased to 1.7 sen per diem, and the city money rate stood at 2.3 sen minimum. In the meantime the outbreak of the Balkan troubles affected the European money market, which presented an unusual stringency. The Bank of Japan, taking the situation at home and abroad into consideration, twice raised its rate by 1 rin. The

private banks all followed the lead of the central bank increasing their rate of interest on deposit from 5 per cent. to 6 per cent.

Foreign trade during the half year under review presented great activity, both in export and import. The value of exports and imports during the period amounted to 297,500,000 and 268,890,000 yen respectively, making a total of 566,390,000 yen. This is a gain of 64,460,000 yen, or 54,970,000 yen in exports and 64,460,000 yen in imports, on the figures of the corresponding period of the previous year. The conspicuous increase in the volume of exports and imports testifies to the recent development of our economic world. The increase of exports is principally attributable to the sudden growth of demand in China and the activity of the financial world in Europe and America, and the increase of imports, which was especially remarkable in the volume of raw materials, is owing to the advancement of national industries.

The exchange business of the bank during the period was very prosperous, favored by the activity of foreign trade. The amount of the bills from Japan dealt with during the period reached 171,330,000 yen and the bills from abroad 172,120,000 yen, recording an increase of 25,280,000 and 23,610,000 yen respectively, or 48,890,000 yen in total, over the like period of the previous year.

After dwelling on the economic situation in the Occident, the president stated that the business of the bank during the term, though it had more or less suffered from the stringent money situation at home and abroad, showed a better result than the preceding term, netting a profit of 3,369,061 yen, including 1,198,759 yen, the balance brought forward from the previous term.

The usual balance sheet and the following plan of accounts and distribution, were then submitted to the meeting and unanimously adopted:

	Yen.
Gross receipts	15,829,900
Balance brought over from the previous term	1,198,759
Disbursements	12,460,839
Net gains	3,369,061
To be distributed as follows:	Yen.
Reserve	350,000
Dividend to shareholders (12% per annum)	1,800,000
Balance carried forward to next accounts	1,219,061

Formosan Bank.—At the twenty-seventh general meeting of the Formosan Bank, the accounts for 1912 were as follows:—

	Yen
Total Revenue	3,843,634.00
„ Expenditure	3,329,493.20
Net profit	514,140.80
Brought over from the previous account	219,316.67
Total	733,457.47
Reserve for loss	120,000.00
Reserve for payment of dividend	20,000.00
Special reserve	20,000.00
Bonus	32,000.00
Dividend (10 per cent. per annum)	312,500.00
Carried forward to next account	228,957.47

Chartered Bank of India, Australia and China.—The Far Eastern branches of this Bank have received the following telegram from the Head Office:—At the approaching Annual General Meeting of Shareholders, the Directors will recommend, after paying a Bonus of 10% on the salaries of the Staff, that a dividend be declared for the past half year at the rate of 15% per annum and a Bonus of 10/- per share free of Income Tax; that £50,000 be added to the Reserve Fund (which will then stand at £1,700,000); £20,000 to be added to officers' Superannuation Fund; £30,000 to be written off Premises Account, and £132,569-10-9 be carried forward.

Oriental Development Co. Loan.—The flotation of a foreign loan by the Oriental Development Company is reported to have been concluded through the Franco-Japanese Bank on the following conditions:

Total amount, 20,000,000 yen: Interest, 5% per annum; Issue value, 96¾ francs; Actual receipt, 91¾ francs: Commission, 5 per cent.; period of maturity, 25 years, after being unredeemed for 5 years. Abonnement (revenue dues) is to be borne by the holders. The loan hitherto raised by the company amounts to some 7,500,000 yen. The new foreign loan, it is said, is intended for the redemption of the standing loan and for the purchase of land which is estimated to cost some 7,000,000 yen.

The Bank of Chosen.—The report of the Bank of Chosen for the past half-year shows a satisfactory business compared with the previous term, the net receipt for last term showing an increase of about 45,000 yen over the previous report. The accounts are as follow:—

Net gain for last term	205,405
Balance brought over from the previous term	5,998
Total	211,403
Reserve against losses	24,000
Reserve for equalisation of dividend	5,500
Bonus to officials, etc	14,300
Dividend to shareholders (6% per annum)	157,500
Balance carried forward to next term	10,103

COMPANIES

China Provident Loan and Mortgage Co., Ltd.—The sixteenth annual report of this company states that gross earnings for the past year amounted to $147,082.52 and after deducting interest paid and all expenses, remuneration to general managers, consulting committee's and auditors' fees, and including the balance of $1,394.55 brought forward from last year's account, there remained a sum of $95,274.55 which it was recommended should be appropriated as follows, viz:—To place to Reserve Fund, $5,000; To pay a dividend of 70 cents per share, $87,500; To carry forward to the credit of next year's account, $2,774.55.

Anglo-German Brewery Co., Ltd.—The directors of the Anglo-German Brewery Co., Ltd., Shanghai, have declared a dividend of 8 per cent. for the year 1912.

The Hang-yeh-ping Co.—An extraordinary meeting of the shareholders of the Hang-yeh-ping Co. took place on March 29 at Shanghai. 113,235 shares were represented. Mr. Wang, Chairman of the Board of Directors, presided and laid before the meeting a plan for sale of the property to the Government. To this the shareholders objected, and proposed, as an alternative that Sheng Hsuan-hui (Sheng Kung-pao) be elected as Managing Director. The Board of Directors suggested eight plans by which the Company could hope to benefit, namely: (1) the suspension of the payment of interest, (2) the extension of time for the repayment of foreign loans, (3) the reduction of the rate of interest on outstanding loans, (4) The exemption from duty of the Company's imports and exports, (5) permission from the Government to use the funds of the Government Bank and the Bank of Communications free of interest, (6) Government protection of Company's production, (7) a loan from the Government, (8) an arrangement under which the Government would purchase the output of the Company in preference to purchasing from abroad. None of these solutions of existing difficulties appealed to the shareholders, and Mr. Sheng Hsuan-hui was elected Managing Director by votes representing 105,409 shares to 7,926.

The immediate installation of a fourth blast furnace at the Hanyang Iron and Steel Works has been decided upon, and the first shipment of structural steel, etc., in connection therewith has already left Europe. The material is expected to arrive at the Works in about one month from date, and as it is intended to press on with the work of erection, it is anticipated that the furnace will be completed and "blown-in" within twelve months from the present time. With this addition to the existing plant the Works will have a productive capacity of 800 tons of pig iron per day, and will be in a better position to satisfy the heavy demands for pig iron now being received from Japan, the U.S.A., and Australia.

The Ministry of Industry and Commerce has decided to place the Hanyang Iron Works which forms only one part of the Hanyehping Mining and Iron Works Company under state ownership, and has sent Mr. Chai Long-zu to investigate the inner state of the Iron Works. The investigations have been made and Mr. Chai has sent in a report, showing that the number of machines, big and small, aggregates 152 pieces, with an output of upwards of 15,000 tons of cast iron, 7,000 tons of steel rails as well as an indefinite amount of steel plates, rivets, and nails per month.

Yangtsze Wharf & Godown Co., Ltd.—The report of the directors for 1912 states that the year's working has resulted in a net profit of Tls. 6,611.65, to which the balance brought forward from 1911, Tls. 676.11 being added, the sum of Tls. 7,287.76 remains at credit of profit and loss account to be dealt with. This sum it is proposed to appropriate as follows:—write off on buildings, pontoons, etc., Tls. 2,310.00; write off on steam launch Tls. 500.00; and to carry forward Tls. 4,477.76. The property of the company has been kept in first class repair and the cost charged to working expenses.

The Hongkong Fire Insurance Co., Ltd.—The Forty-fourth report of the company is as follows:—1911 Account—This account shows a net profit on working of $284,317.18. This sum it was proposed to deal with as follows, viz:—

Dividend of $27 per share	$216,000.00
Bonus to Staff	2,100.00
Addition to Reinsurance Fund	63,217.18
	$284,317.18

1912 Account.—The balance at credit of this account is $415,157.20.

Hakodate Dockyard.—At the thirty-third general meeting of the Hakodate Dockyard the following accounts were passed:—

	Yen
Profit	32,689.480
Brought over from previous business period	3,708.730
Total	36,398.210
Reserve	1,700.000
Special reserve	4,000.000
Bonus	3,225.000
Dividend (8 per cent. per annum)	22,800.000
Carried forward to next account	4,673.210

Toyo (Japan) Life Insurance Co.—At the general meeting of the Toyo Life Insurance Company the following accounts were passed:—

	Yen
Profit	21,894.982
Legal reserve	1,184.000
Bonus	2,200.000
Dividend (8 per cent. per annum)	10,000.000
Reserve for dividend	500.000
Reserve against losses	4,500.000
Carried over to next account	3,610.982

Bangkok Manufacturing Co.—The Directors' report for the half-year ended 31st December, 1912, stated that the gross profits on the Company's operations for the six months amount to Ticals 4,786,63. To this amount had to be added Ticals 5,121.04 the balance brought forward from last half-year making a total of Ticals 9,908.57. This amount had to be deducted from Ticals 11,138.14 the sum allowed for depreciation, and Auditor's Fee Ticals 400, which left a nett loss of Ticals 1,629.57 to be carried forward to next half year. One of the items in the profit and loss account was "defalcation Ticals 4,943,96"

Hongkong Rope Manufacturing Co., Ltd.—The report of this Company states that the balance at credit of profit and loss account, after allowing for the interim dividend of $60,000.00 paid in August last, is $65,471.58, which it was proposed to appropriate as follows:—

To place to reserve fund	$ 3,000.00
To pay a final dividend of $1.00 per share	60,000.00
To carry forward to the credit of next year's account	2,471.58

Hongkong and Whampoa Dock Co., Ld.—The annual report of this company states that the nett loss for the year ending December 31st, 1912, after debiting profit and loss account with all charges, including directors, and auditors' fees, writing off bad debts and without taking any credit for proportion of establishment charges on uncompleted work, is $108,679.15.

Balance brought forward from last account	$149,591.07
Less loss as above	108,679.15
Leaving to be carried forward to new account	40,911.92

The Shanghai Tug and Lighter Co., Ltd.—The report of the directors for the year ended 31st December, 1912, states that there was at the end of the year the sum of Tls. 135,425,58 at the credit of Profit and Loss Account. It was recommended that this sum should be distributed as follows:—

	Tls.
To a Dividend of 7% on 10,000 Preference Shares	35,000.00
To a Dividend of 5% on 20,000 Ordinary Shares	25,000.00
To write off for Depreciation	65,000.00
To a special Reserve	5,000.00
To carry forward	5,425.58
	Tls. 135,425.58

The Shanghai Horse Bazaar Co., Ltd.—The Directors of the Shanghai Horse Bazaar Co., Ltd., state that the audited accounts for the year ended 31st December, 1912, show a balance at the credit of Profit and Loss Account of Taels 29,408.84 which the Directors recommended the shareholders to deal with as follows:—

A Dividend of 8%	Tls. 21,600.00
Carry forward to a new Profit and Loss Account	„ 7,808.84
	Tls. 29,408.84

The Hongkong Ice Co., Ltd.—The thirty-second annual report of the above Company for the year ending December 31, 1912, states that including $23,822.86 brought forward from the previous year, and after deducting $10,000 paid as an interim dividend of $2 per share, the balance at credit of Profit and Loss Account was $63,335.88 which it was recommended should be appropriated as follows:—

A Final Dividend of $8.00 per share,	$40,000.00
To write off Property A/c.,	13,500.00
To write off Launch and Lighter A/c.,	1,500.00
To carry forward,	8,335.88
	$63,335.88

Kanegafuchi Spinning Co., Ltd.—The fifty-second report of this company shows that the net profit for the period amounted to Yen 1,723,600, which is equal to 10.82 per cent. on the paid-up capital of Yen 15,927,650. With the balance brought forward from last account the total standing to the credit of profit and loss is Yen 2,646,273 Profit and loss account contains the following items:—Stocks of manufactured goods in process Y. 1,458,903: raw materials consumed, and general expenses of company Y. 26,620,760: interest on debentures Y. 202,500: written off for depreciation Y.300,000. On the credit side of the account appear:—Sales of manufactured goods, wastes, etc., sundry receipts and rebates Y. 28,520,213: and stock of manufactured goods and goods in process Y. 1,785,649. The Company has a reserve of Y. 6,038,191, made up as follows:—

General reserve	Y.4,038,191
Special reserve	1,000,000
Reserve for equalizing dividends	1,000,000

Debentures to the extent of Y.3,000,000 have been issued, besides which the same value of debentures was taken over from the Kenshi Boseki Kaisha. The open account for raw material amounts to Y. 1,051,435.

Siam S. N. Co., Ltd.—The ninth half-yearly balance-sheet of the Siam S. N. Company showed a nett profit of Ticals 174,426.61, including the balance of Ticals 5,841.24 from the preceding half-year, whereof it was proposed to utilise Ticals 55,148.58, being 5% per annum on the cost value of the steamers, 10% per annum of the launches, lighters, etc., as depreciation, leaving Ticals 119,278.03 to be divided as follows:

5% Dividend to the Shareholders	Tcs.	100,000.00
Remuneration to the Directors	„	1,343.68
Carried to Reserve Account	„	10,000.00
To be carried forward to next half-year	„	7,934.35
Total	Tcs.	119,278.03

Menam Motor Boat Co., Ltd.—The report of the Directors and statement of accounts for the year ended December 31st, 1912, states that the gross receipts were Ticals 138,745.36 and the expenses 107,649.90, leaving a profit for the year of 31,095,46. To Interest Ticals 3,416.75; to Depreciation 18,176.09; to Employees' Discharge reserve 1,000.00; to Audit Fee 250.00, totalling 22,842.84, leaving 8,252.62. The balance from last year was 522,75, leaving available for distribution 8,775.37. This amount the Directors recommended should be apportioned as follows:—By paying a dividend of 4 per cent. absorbing Ticals 8,000.00; carrying forward to next year 775.37.

Shanghai Gas Co., Ltd.—The reportof the directors of the Shanghai Gas Co., Ltd., for 1912, states that the profit on working account amounted to Tls. 306,584,59 against Tls. 321,455,54 for 1911, the decrease resulting from the decreased charge for lighting gas and not from any falling off in the Company's business. The net profit for the year amounted to Tls. 273,215,75, and the balance at credit of profit and loss account amounts to Tls. 206,637,21, which the Directors recommended to be appropriated as follows: To pay a final dividend for the year 1912 on 24,000 shares at 7 per cent. (making 13 per cent. for the year) Tls. 3.50 per share, Tls. 84,000; to write off for depreciation Tls. 112,216,64; and to carry forward Tls. 10,420.57. During the year 534,001,600 cubic feet of gas were sold to private consumers, an increase of 3.4 per cent.

Kochien Transportation & Tow Boat Co., Ltd.—The report of the directors for 1912 states that the result of the working for the year is a net balance at credit of profit and loss account of Tls. 26,105.47, after allowing, Tls. 19,574,00 for depreciation on the fleet, which now stands at Tls. 370,626.00. The directors recommended that this balance at credit be disposed of as follows:—To pay a dividend for the year of 5 per cent., Tls. 18,350.00, and carry forward Tls. 7,755.47.

Siam Electricity Co., Ltd.—The 12th Directors' report and statement of accounts for the year ending 31st December, 1912, stated that the gross profits for the year were Tcs. 1,163,261.97, which after deduction of Depreciation 299,630.00; Debenture Interest 79,523.99; Bad debts written off 24,304.46; General Expenses, including Street watering and Automobiles 69,459.74; Expenses for changing fans, &c., to new system 30,799.41; Insurance Fund 20,000.00 and Auditor's Fee 1,500.00, totalling 525,253.60, left a net profit of 638,008.37, added to which the balance for last year 166,584.38, makes a total at the disposal of the Company of 804,592.75, which it was proposed to distribute as follows:—Redemption Fund 20,000 00; Directors' Fees 23,132.92; Dividend, 12 per cent. 398,500; Bonus for year 1912 150,000; and to carry forward 212,959.83.

Shanghai & Hongkew Wharf Co., Ltd.—The report and statement of accounts for the year ended December 31st last, states that the balance at credit of Profit and Loss Account amounts to Tls. 174,370, after payment of the Interim Dividend of Tls. 3 per share on August 16th last. It is proposed to pay a Final Dividend of Tls. 4 per share, making 7 per cent. for the year; to place Tls. 25,000 to credit of Repairs' Account, and to carry forward Tls. 5,370. The net profit for the year amounted to Tls. 282,370. Last year, as the balance brought forward on January 1st amounted to only Tls. 48,760, the sum of Tls. 80,000 was transferred to Profit and Loss Account from Equalization of Dividends Account, in order that a final dividend of Tls. 3 might be paid. Tls. 20,000 of this amount was transferred to Repairs' Account. Included in the Liabilities appearing in the Balance Sheet are:—Accounts payable Tls. 88,195; owing to Jardine, Matheson and Co., Ltd. Tls. 257,841; this is a less amount than was owing at the close of the previous year: Equalization of Dividends Account Tls, 25,000: Reserve Fund Tls. 686,983. The value of property, including additions during the year, is Tls. 5,717,890: and amount of accounts receivable Tls. 119,701.

Shanghai-Sumatra Tobacco Co., Ltd.—The report of the directors for the year ended October 31, 1912, states that crop 1911 from 447 fields, weighed net in the Amsterdam market 280,312 kilos (4,484,992 piculs) and realized an average price of Guilders 1.17½ per half kilo. The year's working shows a loss of Tls. 66,631,02, which is carried to profit and loss account. This disappointing result is almost entirely accounted for by the high rate of exchange ruling during the year. The disbursements for the crop of 1911 were made when exchange was much lower and the returns have to be calculated at the average rate for the year. For the next crop the disbursements have been made on the higher rates and the crop has therefore cost considerably less.

Shantung Colliery Co.—At the general meeting of the Shantung Colliery Company at Berlin, the proposed dissolution and transfer of the undertaking, with all its assets, to the Shantung Railway Company was sanctioned by the shareholders, the absorbing company paying as purchase price Mks. 5,400,000 new shares to the Colliery Company. The shareholders of the Shantung Railway have approved of the proposed capital increase by Mks. 6,000,000 required for carrying through the operation. The balance of Mks. 600,000 new shares will be placed direct on the market at a price not lower than 110 per cent.

Nippon Menkwa Kabushiki Kaisha.—According to the statement of accounts of this company for the half-year ended December 31, 1912, the net profit for the period amounted to Y.322,492.55; adding the balance of Y.176,387.82, brought forward from June 30, 1912, there is a total of Y.498,880.37 available for distribution. This sum is distributed as follows:—Reserve fund Y.200,000; dividend 15 per cent. (Y.3.75 per old share and Y.2.03125 per new share) Y.115,625; carried forward Y.183,255.37. In accordance with the Company's Article X, this company called in, on February 1, the fourth and final payment of Y.12.50 per share on 20,000 new shares.

Belgian Enterprise in Bangkok.—The Belgian company which is to take over the tramways and electric works at Bangkok, hitherto owned by a Danish company, has now been formed in Brussels, under the title Tramways et Electricité de Bangkok. The new company has a capital of f.12,000,000. The principal parties interested are the Mutuelle de Tramways (who participate to the extent of f.3,000,000), the Economiques (f.1,000,000), the Générale belge d'Enterprises electriques (f.1,000,000), the Financière de Transports (f.1,300,000), the Banque de Reports de Fonds Publics et de Dépots (f.1,000,000), the Crédit Anversois (f.1,000,000), and the Compagnie Centrale de l'Industrie Electrique (f.1,000.000). The administrators and directors include Count de Castellane, MM. F. Charlier, O. Collet, A. Jacops, J. Rolin, M. Seret de Smet de Naeyer, Ch. Charlier, Baron Jansen, H. Urban, Ch. Cicogna, D. Heinemann, Ed. Thys, F. Lambeau, A. Fraiteur, and P. Osterrieth.

The China-Borneo Co., Ltd.—The tenth ordinary yearly report of the Company states:

The accounts show a profit of	$68,785.28
From this has to be deducted:—	
Fees to consulting committee	4,000.00
Leaving available for appropriation	$64,785.28
The consulting committee recommended that a dividend of 85 cents per share on the subscribed capital be paid to shareholders	$39,100.00
Write off launches and lighters	7,500.00
Write off Hongkong saw mills	5,000.00
Write off Sandakan saw mills	5,000.00
Write off plant account	2,500.00
Write off engineering department	5,000.00
Write off timber concessions	685.28
	$64,785,28

China Sugar Refining Co., Ltd.—The report for the year 1912 stated that the demand for the Company's sugars was much restricted both in China and other markets throughout the year, and although fairly remunerative rates were obtainable for the first six months, there was subsequently a sharp decline in prices, caused by keen competition in the consuming markets and the general fall in the value of sugar which took place all over the world. The year's working resulted in a loss of $223,085.95, to meet which and to provide for the payment of a dividend a sum of $350,000.00 has been transferred from equalization of dividend fund to credit of profit and loss account, which then showed a balance at credit of $79,795.95. The general agents and consulting committee recommended that out of this a dividend of $3.00 per share be declared, absorbing $60,000.00, and that the balance of $19,795.95 be carried forward to next account.

Luzon Sugar Refining Co., Ltd.—The report for the year 1912 stated that there was a fair demand for the Company's sugars in the local market throughout the year, and for the first six months remunerative prices were obtainable During the second half of the year there was a sharp decline in sympathy with the general fall in values elsewhere, but the result of the year's working showed a gain of $34,839,25. After allowing for interest and other charges the balance at debit carried forward had been reduced to $47,375.67. The exchange on liquid assets remains at par.

China Fire Insurance Co., Ltd.—The annual report and statement of the company's accounts made up to December 31, 1912, was as follows:—

1911 Account.—This account shows a net profit on working of $382,278.19, which sum it is proposed to apportion as follows:—

Dividend of $7, bonus of $3 per share on 20,000 shares	$200,000.00
To add to extra reserve fund, which will then stand at $742,575.13	25,326.67
To add to investment fluctuation account	20,000.00
To provide for the inauguration of an exchange fluctuation account	31,000.00
To add to reinsurance fund	100,000.00
Bonus to office staff	5,951.52
	$382,278.19

1912 Account.—The balance at credit of this account is $487,159.43

China Traders' Insurance Co., Ltd.—The report for presentation to the shareholders at the forty-seventh ordinary meeting stated:—

1911 Account.—After payment of the interim dividend of $4 per share and the bonus of 20 per cent to contributors passed at the last annual meeting there remained a balance of $473,089.47.

The board recommended that this sum be appropriated as follows:—

A final dividend to shareholders of $6 per share on 24,000 shares	$144,000.00
An addition to the Reinsurance Fund of £10,000 at Exchange 2/0 15-16d.	96,240.60
To be carried forward to Underwriting Suspense Account to close the account for the year 1911	232,848.87
	$473,089.47

1912 Account.—The balance of working account on the 31st December, 1912, was $1,264,267.67. The board recommended that an interim dividend of $4 per share be paid to to shareholders, absorbing $96,000 and that a bonus of 20 per cent. be paid to contributors, absorbing about $125,000 and that the remainder be carried forward.

Union Insurance Society of Canton, Ltd.—The report for presentation to the shareholders at the fortieth ordinary meeting stated:—

1911 Account.—After payment of the interim dividend of $30 per share and the bonus of 20 per cent. to contributors passed at the last annual meeting there remained a balance of $962,012.91.

The board recommended that this sum be appropriated as follows:—

A final dividend to shareholders of $20 per share on 12,400 shares	$248,000.00
An addition to the Sterling Reserve Fund of £25,000 at Exchange 2s. 0 15-16d.	240,601.50
To be carried forward to Underwriting Suspense Account to close the account for the year 1911	473,411.41
	$962,012.91

1912 Account.—The balance of working account on the 31st December, 1912, was $2,698,386.97. The board recommended that an interim dividend of $30 per share be paid to shareholders, absorbing $372,000, and that a bonus of 20 per cent. be paid to contributors, absorbing about $250,000 and that the remainder be carried forward.

New Philippines Incorporations.—cles of incorporation of the C. T. Robinson C pany, limited, have been filed with the Man bureau of archives. The company is capitalized at P.100,000, of which P.32,000 has been subscribed and of this amount P.8,000 has been paid up. The company is to conduct a stevedoring and lightering business. The directors are C. T. Robinson, John W. Haussermann, J. H. Gibson, Adam C. Bailey and Charles C, Cohn, treasurer.

The Sociedad Agricola de Jean, a corporation formed to merchandise palay, has been incorporated, with a capital of P.10,000, of which amount P.7,310 has been subscribed and paid up. The incorporators are Antonio Vazquez Arias, Gerardo Vazquez Arias, Crispulo Sidece and seven others. This company has been formed in the province of Nueva Ecija.

A corporation has just been formed by residents in the Philippines for the manufacture of a new roofing material, which, if the hopes of the incorporators are realized, will revolutionize the building industry in the Islands. The new material is a composition consisting of 80 per cent. sawdust, and 20 per cent. of other ingredients known only to the manufacturers, and the promoters of the new company state that the finished product is more durable than nipa or galvanized iron, is cheaper, and possesses the inestimable advantage of being absolutely fire and water proof. The composition is called "broclaynite."

Articles of incorporation have been filed by the Leyte Land Transportation Co., Ltd., which has been organized with a capital stock of P. 120,000 for the purpose of motorizing Leyte's transportation facilities.

Articles of incorporation of the Philippines Sugar Estate Development Co., Ltd., have been filed in the bureau of archives. This corporation is backed by five million pesos of Manila capital, all fully subscribed and paid up. The capital stock is divided into 50,000 shares at a par value of P.100 each. The articles of incorporation set forth that the company will engage in the planting, harvesting, milling and sale of sugar, rice and other agricultural products and devote itself to agricultural developments in general, besides investing in railroads, steamships and other means of transportation, and installing sugar and rice mills and other machinery. The company has its head office in Manila. The incorporators are Buenaventura Campa, Manuel Alonso, Aciselo Alfajeme, Miguel Garcia Grande, Francisco Garcia, Valentin Marin, Ulpiano Herreo and Juan Gonzalez. Of these the following five gentlemen constitute the board of directors: Buenaventura Campa, Manuel Alonso, Miguel Garcia Grande, Francisco Garcia and Valentin Marin. Don Carlos Odriozola is secretary. This company has grown out of a concern that was organized in 1900, and the articles of incorporation states that its existence is for fifty years from that year. The company owns vast lands in La Laguna province and other parts of the islands.

A Philippine marine and fire insurance company with a capital of P.1.000,000 is in the process of organization. It is to be known as "Filipinas" and among the subscribers are prominent Filipino and Spanish businessmen and capitalists. The promoter is Antonio Melian and a meeting was held recently for the purpose of organization. Besides fire and marine, accident insurance is contemplated. Half the capital stock has already been subscribed upon which the first assessment of 50 per cent is payable at once and the balance in one year. The headquarters of the company will be in Manila and branches will be established throughout the islands. The governing board will consist of seven directors.

Articles of incorporation have been filed, creating a new company to take over the boat and engine department of the Manila Trading and Supply Company, the Island Boat Works, and "La Sanidad." The name of the concern is the Philippine Hardware Company, of which E. J. Smith, head of the Island Boat Works, is the manager. The president of the new

company is G. D. Adams of Cleveland, Ohio, who was president of the Manila Trading and Supply Company. The new company is capitalized at P.100,000 and will engage in the building and repairing of launches and small craft, and handle paints, oils and varnishes, boats, gasoline engines and accessories.

The Hongkong and Kowloon Wharf and Godown Co., Ltd.—The twenty-sixth annual report states that for the year ended 31st December, 1912, the balance t credit of Profit and Loss account, including $19,392.63 brought forward from last year, and after deducting Directors' and Auditors' fees, and paying for all interest and repairs, amounted to $518,490.91, which it was proposed to appropriate as follows:—

To pay a dividend of 7 per cent. from working profits	$210,000.00
To pay bonus of 2 per cent. from profits on sale of property ..	60,000.00
To write off launches	5,658.26
„ „ Lighters	18,600.36
„ „ Machinery	11,114.91
„ „ Kowloon Wharves ..	31,481.24
„ „ West Point Wharf ..	454.61
„ „ Railway and Rolling Stock	8,481.79
To transfer to Equalisation of dividend fund	150,000.00
To carry forward to new account	21,690.74
	$518,490.91

Shanghai Land Investment Co., Ltd.—The report of the directors for the year ending December 31, 1912, states that the working account for 1912 has a credit balance of Tls. 451,366.48, as compared with Tls. 435,672.60 for 1911. The gross rentals show an increase of Tls. 25,240.46 and the running expenses, *i.e.*, repairs, etc., (Tls. 138,607.01), are decreased by Tls. 13,407.97 owing to the reduced expenditure on repairs, leaving an increase in net rentals of Tls. 38,648.43. The increase in rentals is partly due to new houses, but principally to a general increase in both foreign and Chinese rents. It is proposed to withdraw a further sum of Tls. 50,000 from the reserve fund for the equalization of dividends, which will then stand at Tls. 150,000. The improvements and renewals account has been credited with Tls. 78,363.46 as authorized at the general meeting and has been drawn on to the extent of Tls. 22,301.13. It is proposed to credit this account this year with Tls. 69,201.92, being interest on undeveloped land, bringing the credit balance up to Tls. 185,533.70. The amount at credit of profit and loss account, after adding Tls. 50,000 transferred from equalization of dividend fund and deducting the interim dividend paid in July last, is Tls. 334,448.56, which the directors recommend for appropriation as follows:—Final dividend of 6 per cent., making 11 per cent. for the year Tls. 234,000.00; transfer to improvement and renewals account Tls. 69,201.92; carry forward to new account Tls. 31,246.64. Mortgage loans amount to Tls. 2,287,829.07 advanced against land and buildings and are fully covered.

The Hokkaido Colliery Steamship Company.—The Hokkaido Colliery Steamship Company appointed a committee from among the shareholders in April last to devise means for readjusting the company's affairs, and relieve the company from its financial difficulties. A special general meeting in January last adopted the recommendation of this committee to reduce the capital by Y.9,000,000 and issue new preferential shares bearing interest at 7½ per cent. The troubles which had been pending for many years were disposed of. The Company has agreed to entrust the sale of its coal to the Mitsui Bussan, while the management of the "Temiya-maru," the "Sorachi-maru," two steam launches, and 120 sailing ships has been entrusted to the shipping department of the Mitsui Bussan, with a view to economising expenditure. In this way, the Hokkaido Colliery Steamship Company will in future concern itself only with the digging of coal and one or two other lines of business. The company has dismissed 24 of its staff in the Tokyo office, formerly numbering 44, transferring its Tokyo office to the premises of the Mitsui Bussan.

Tientsin Gas & Electric Light Co., Ltd.—At the annual general meeting of the Tientsin Gas & Electric Light Co., Ltd. the directors report and the Balance Sheet for 1912 were duly passed, and the proposal of the directors, as to the distribution of the profits, agreed to. The company has already paid an *ad interim* dividend of 4% and now pays another 8%, making the return of 12% for the year.

Japanese Spinning Companies.—The Kanegafuchi Yarn Spinning Co. will shortly amalgamate with the Asahi Yarn Spinning Co. in Osaka, the matter having already been settled between the authorities of the two companies. The Asahi company is a new establishment with authorized capital of 5,000,000 yen, of which 1,250,000 yen is paid up.

New Engineering and Shipbuilding Works (Shanghai).—The report and accounts of the New Engineering and Shipbuilding Works, Limited, for the year ended December 31st, 1912, the first to be issued since the amalgamation with the Vulcan Iron Works, Limited, which was agreed to in April of last year, show that the result of the year's working was a net profit of Tls. 30,203, which together with the amount brought forward from last year brings the total at credit of profit and loss account to Tls. 41,256. This amount the directors recommended should be appropriated as follows:—

To pay a dividend of 14 p.c.	..Tls. 30,588
„ carry forward..	10,668

Toyo Kisen Kaisha.—The Toyo Kisen Kaisha (Oriental Steamship Company), at a general meeting of shareholders distributed its profits as follows:

	Yen.
Profits	433,592.701
Brought over from the Preceding Accounts	8,893.473
Total	442,487.174
To Reserves	22,000.000
To Dividend (12% for new shares, 8% for old shares) ..	416,000.000
Carried forward	5,487.174

PERSONAL

The Republic of Venezuela has recently established a Consulate at Yokohama and Mr. I. Bickart of Oppenheimer and Co., has been appointed Consul.

Viscount Mishima has been appointed President of the Bank of Japan, and Mr. Mizumachi, President of the Yokohama Specie Bank.

Mr. Carl A. de Gersdorff, heretofore a partner in the firm of Cravath, Henderson and de Gersdorff, Attorneys-at-law, has been admitted to partnership in the firm of William Saloman and Co., of New York.

Mr. L. F. H. Hake of the Asiatic Petroleum Co., the commander of the German Volunteer Company, Hankow, has had the fourth order of the Prussian Crown conferred upon him and Mr. C. Grapow, superintendent of the German Police, Hankow, has received the Cross of Merit in silver from H. M. the King of Prussia.

Mr. Esson M. Gale of the American Consulate at Shanghai has resigned and accepted a position in the financial department of the general agency for China of the Singer Sewing Machine Co.

The death occurred at Southampton in February of Mr. R. F. Trevithick, for many years connected with the Government railways in Japan. Mr. Trevithick, who was the grandson of Richard Trevithick, "the pioneer of steam locomotion," left Japan about nine years ago. During his residence in Kobe he was known as an enthusiastic yachtsman.

Moves shortly to take effect in the British Consular Service in Japan, Korea and Formosa are as follows:—Mr. Oswald White, now Acting Vice-Consul at Yokohama, will be Acting Vice-Consul at Osaka, relieving Mr. E. H. Holmes, now Vice-Consul at that place, who takes up the post of Acting British Consul at Shimonoseki. Mr. Hugh Horne, now Acting Consul at Shimonoseki, will be Vice-Consul at Kobe, where he will act as Consul-General until the arrival of Mr. Arthur Hyde Lay, now on leave, who will be Acting British Consul-General at Kobe during Mr. Consul-General Layard's absence on leave. Mr. G. H. Phipps, now Acting Vice-Consul at Kobe, proceeds as Acting Vice-Consul to Seoul, replacing Mr. C. J. Davidson, who will take Mr. White's place as Acting British Vice-Consul at Yokohama. Mr. J. B. Rentiers, now Consul at Tamsui, goes as Consul to Honolulu, being replaced by Mr. T. J. Harrington, now in Honolulu.

The Rt. Hon. Sir Savile Brinton Crossley, K.C.V.O., will, it is reported, visit Japan shortly.

Mr. Denison, Adviser of the Japanese Foreign Office, who had been at home on furlough, has returned to Japan.

Mr. C. W. C. Parr, of the Federated Malay States service, has been appointed Governor of British North Borneo in succession to the late Mr. Scott Mason.

Mr. John Archibald, agent of the National Bible Society of Scotland, and proprietor of the *Central China Post*, has left Hankow for home on a visit.

Mr. Watson, Commissioner of Customs, Harbin, has been granted leave of absence.

Captain Lecky, of the British Army, has arrived at Tokyo as a substitute for Captain Piggott, who had left for home.

Dr. Rhomberg, the new Councillor of the German Embassy, has reached Tokyo. His predecessor, Herr von Radowitz, has been transferred to Paris.

Mr. F. J. Hall, of Messrs. Cornes and Co., Yokohama, has left for England.

Mr. Joseph A. Skinner, Managing Director of the Holyoke (Mass.) Silk Mills, who, together with his brother, Mr. William Skinner, is co-director and proprietor of the same, is visiting Japan.

It is announced from Ottawa that Mr. Richard Grigg, the Canadian Commissioner for Commerce, is leaving for the Far East for the purpose of investigating opportunities for the extension of Canadian trade with Japan and China. While in the Orient he will meet Mr. Foster, the Minister for Trade and Commerce, who will go to the East after the sittings of the Dominions Trade Commission in Australasia.

The representatives of the Japanese Aeroplane Company, organized at Los Angeles are due to arrive at Yokohama shortly to give a series of flights in Japan. The capital of the company is $8,000 with 800 shareholders. Mr. Takeichi, graduate of the aeroplane school, at San Domingo, Cal., is the aviator and will make his flights on a Curtiss machine

Mr. Arima, manager of the Kobe branch of the Osaka Shosen Kaisha is on a tour of inspection of the shipping business in Europe and America.

Mr. Paul Schmitz, an engineer from Dusseldorf recently arrived in Tokyo to take up a position with the Nippon Steel Pipe Manufacturing Company in which Messrs. Asano and Shiraishi are interested.

Mr. A. J. Fippard, engineer of the Hankow Waterworks and Chinese city electric light works, has left for England via Siberia in company with Mrs. Fippard on a short furlough.

Mr. W. P. G. Taggart, manager of the Cebu branch of the Chartered Bank, has been transferred to Manila. Mr. H. T. Stapleton will take charge at Cebu.

A number of changes are pending in the Indoor staff of the Chinese Maritime Customs. Mr. V. Dent has resigned from the service; Mr. C. Thorne, from home leave, has been appointed to Amoy; Mr. J. C. Johnston goes to Ningpo: and Mr Cupelli to Mengtze.

Mr. Yamaguchi of the Bank of Japan has gone to America to investigate the banking system in that country.

Mr. H. Schlichting has resigned from the chairmanship of the Hankow German Municipal Council on account of ill-health and has been succeeded by Mr. E. Mirow.

Mr. N. F. Perkins, U. S. Vice-Consul General at Shanghai, has gone home on six months' leave of absence.

Mr. E. Tollefsen, district portmaster at the Shanghai Chinese Post Office, handed over charge to Mr. F. P. Donovan on March 31.

The death is announced of Dr. Lee of the audit department, Peking-Moukden Railway, from apoplexy. He was an American-educated Chinese of high attainments, and was popular with all classes of foreigners and his fellow-countrymen.

Mr. A. Pernotte, the manager of the Tientsin branch of the Banque de l'Indo-Chine, has been decorated by the Chinese Government with the order of The "Excellent Corn", for services rendered.

Mr. F. W. Carpenter, the American Minister Plenipotentiary to Siam, was one of the last appointments made by Mr. Taft. He received no news of the confirmation of his appointment by the Senate, and consequently thought, that it automatically expired on March 3. Mr. Carpenter turned his office over to his *Chargé d'Affaires*, and commenced the homeward journey. When he arrived at Singapore, however, he found that the confirmation of this appointment had been received, and he is, therefore, back in Bangkok.

Mr. Lester Maynard, American Consul at Harbin, has been transferred to Amoy, and been succeeded by Mr. S. P. Warner.

Mr. A. L. Fernie has arrived at Chefoo from Shanghai to relieve Mr. R. Rodger of Messrs. Butterfield and Swire, who is shortly going on 'home' leave.

Mr. A. D. Brent has succeeded Mr. A. Henchman in the Dalny agency of Hongkong and Shanghai Banking Corporatio.

Mr. C. H. Godfrey, Engineer and Surveyor to the Public Works Department of the Shanghai Municipal Council, and Mrs. Godfrey and family left for home on March 29.

Mr. J. D. Smart has left Shanghai and gone to Manila, where he will be agent of the Hongkong and Shanghai Bank.

The death is announced of Mr. Louis Bridel, Professor of the Tokio Imperial University. Born in Switzerland, deceased went to Japan about thirteen years ago, being appointed Professor of the Law Faculty of the University. He was greatly respected by the students.

Mr. Niko P. Miliaressy, the well-known civil engineer of Tokyo and corresponding member of the Royal Geographical Society of Greece, has been elected a member of the Imperial Geographical Society of Japan.

Messrs. William S. Fleming and James B. Davies have gone into partnership for the general practice of law at Shanghai.

Mr. Frank W. Hadley, U. S. Vice-Consul General and Mixed Court Assessor at Shanghai, has resigned from the Consular service to engage in business in China.

The Chinese Government Railways

Tientsin-Pukow Line

In addition to the bi-weekly express and daily local service, which shall continue unaltered, a daily direct through service from Pukow to Tientsin and *vice versa*, will be inaugurated from the 1st of May, 1913, with first, second and third class passenger cars but no sleeping cars attached. Dinner service will be provided.

From same date booking for third class passengers on express trains will be discontinued, but a first class passenger may book not more than one-third class servant ticket for which accommodation will be provided.

TIME TABLE

UP TRAIN.

STATIONS		Mon. & Fri. Express	Daily Through Mail Service
Pukow	Dep.	9.00	9.40
Hsuchowfu ..	„	17.44	19.44
Tsinanfu	„	2.30 Tues. & Sat.	7.00 next day
Techow	„	5.31	9.55
Tientsin Cen..	Arr.	10.43	15.35
„ „	Dep.	10.53	16.05
Tientsin East.	Arr.	11.03	16.15

DOWN TRAIN.

STATIONS		Wed. & Sat. Express	Daily Through Mail Service
Tientsin East.	Dep.	13.00	9.40
Tientsin Cent.	Arr.	13.10	9.50
„ „	Dep.	13.20	10.20
Tsinanfu	„	21.54	19.30
Hsuchowfu ..	„	6.41 Thurs. & Sat.	7.05 next day
Nanhsuchow..	„	pass	9.03
Pukow	Arr.	15.15	16.41

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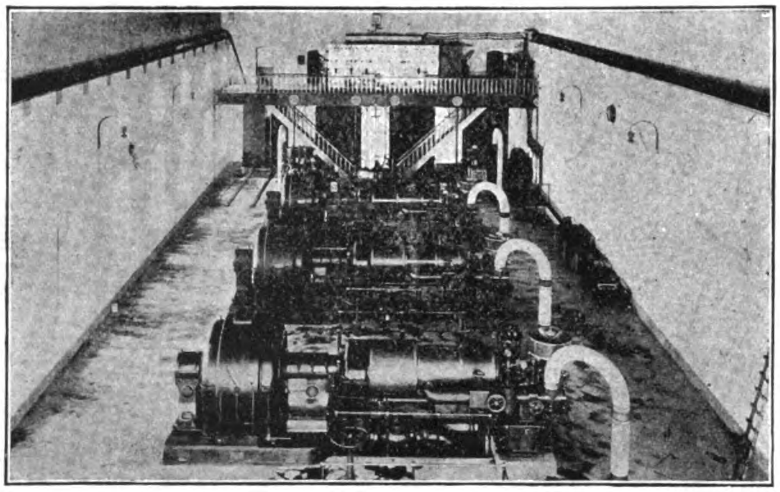

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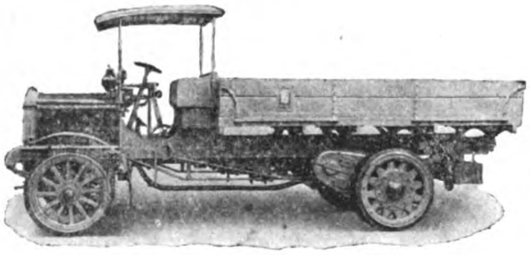

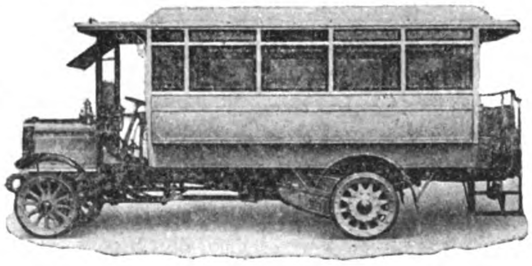

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Russia in Mongolia
A Study of the Situation

China's Reorganisation Loan
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American Recognition of China

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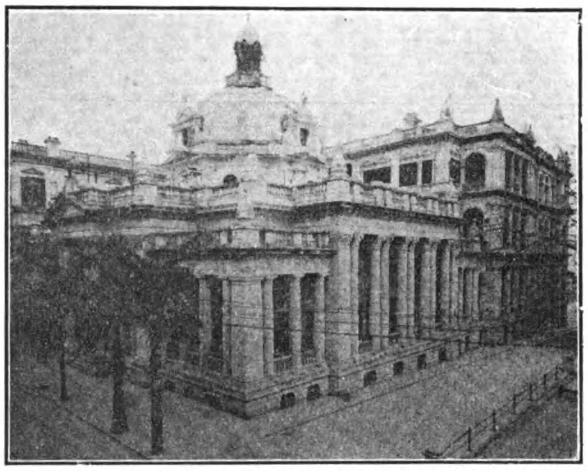

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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, MAY 1913 No. 12

RUSSIA IN MONGOLIA

PRESENT CONDITIONS IN URGA

The decision of the Russian Government to construct a railway from Yerkne Udinsk—on the Siberian railway, east of Lake Baikal—to Kiakhta, on the Mongolian frontier, and the arrangements which are being made to continue that line to Urga, the capital of Mongolia, direct attention to the latter country and the movements which are now proceeding for its development.

Subject to whatever may be the fate of the Agreement between Russia and China now before the Chinese Parliament, Mongolia is practically at the moment a Russian protectorate. Russia has managed to win from the Hutukht'u an agreement which makes her paramount there, whilst China has apparently completely lost whatever dominance she enjoyed in the past. For many years Russia has been courting the Mongol leaders, and the revolution in China gave the long-desired opportunity to them to discard China and cast in their lot with their northern neighbor. This, as was illustrated in the FAR EASTERN REVIEW of September last (*q.v.*), gives Russia almost undisturbed facilities to bring into effect the Asiatic railway policy which she has long cherished, and of which the Yerkne Udinsk-Kiakhta project is part. In the September issue a map showing this policy was published, and is worthy of reference by those interested in the changes that are likely to be manifested in this region in the near future.

For a very long time the Russian merchants living and trading at Yerkne-Udinsk, Kiakhta and Urga have agitated for railway connection. At one time, two routes were surveyed, one designed to bring Irkutsk in close touch with Kiakhta and the other the direct route now adopted between Yerkne-Udinsk and Kiakhta.

It seems to have been the Russian military authorities who held back the decision to construct this line before; their opposition being due on the one hand to the feeling that they would have to increase their military force in Trans-Baikalia, the time for which was not ripe and, on the other, that the Kalgan-Urga line should be commenced before any movement was made in the north. This, of course, was several years ago, but the recent political change in Mongolia removes whatever temporary doubts the Russian military service entertained with regard to pushing a railway south from the Siberian line.

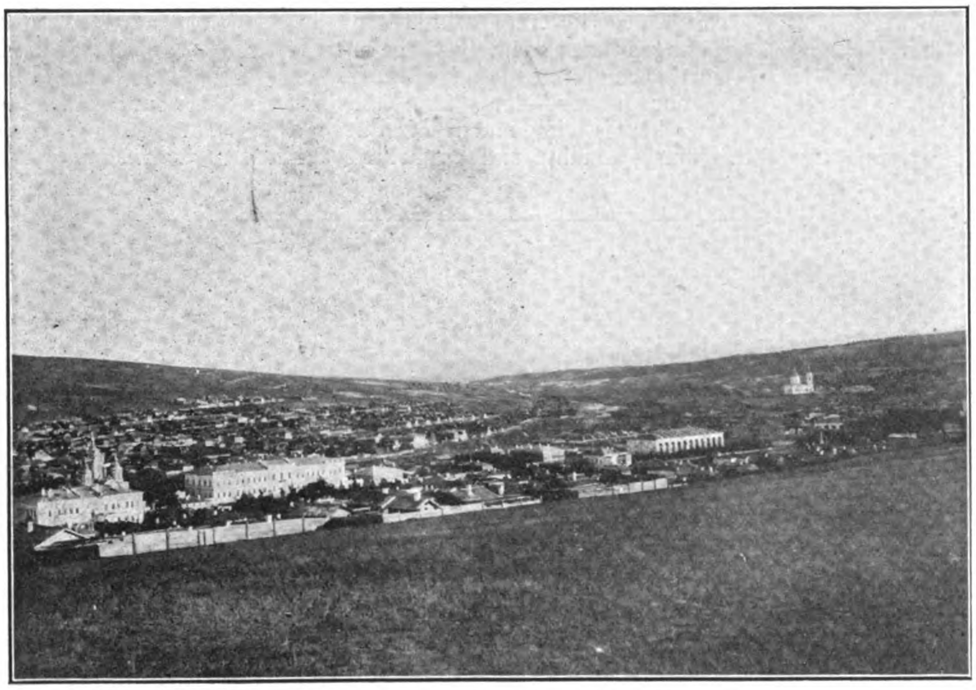
MONGOLIA.—Of the seated figures from left to right the third is the Mongolian Minister of the Interior, Baga da Lama; the fourth is the Russian Commissioner, M. Korostovetz, who went to Urga and fixed up the convention with the Mongols; seated next him is Sannoi Inkkan the Prime Minister; the next figure to the right is M. Luba, Russian Consul-General at Urga; on M. Luba's left is Hanta Chinwang, who was head of the Mission which went to St. Petersburg; two places further along is Dalki Wang, the Minister for War.

Whether a railway will be built between Kalgan and Urga will depend largely upon the pressure that may or may not be exerted by commercial people and those concerned in the development of the rich area between Kalgan and the Mongolian capital. In the past, the Chinese have contemplated a railway for military purposes, but this reason no longer exists.

The Mongolian Development Company, which was formed some years ago under the patronage of Prince Kalachin, had among its objects the building of a line from Kalgan to Kiakhta and the establishment of a service of steamers on the upper waterways of the Yellow River, to be worked in conjunction with the Kalgan-Suiyuan Railway, to connect Pautoouchin

and Ninghsia. The Development Company, though over a million Taels were subscribed for shares, has not yet managed to do anything to put these schemes into effect.

If a railway is built to connect Kalgan and Urga it will probably strike from the existing line at Kweihuacheng; the advantages claimed for this route being that railway construction along it would be comparatively easy and branches could be constructed with facility to the west and to Uliassutai. This route was surveyed by Chinese in 1910, and the route along the direct telegraph line which would be shorter and cheaper, was reported upon by Mr. C. D. Jameson in 1897. As far as Han-no-pa the latter route would have very heavy gradients, but after that there are no engineering difficulties to speak of. It would seem from reports that a railway crossing Mongolia from Kalgan to Urga, would be a success from a purely financial point of view, and this is what will determine the ultimate construction of a line.



MONGOLIA.—General View of Kiakhta

Causes of Mongolian Independence

In order that the present situation may be understood it is necessary briefly to give a sketch of conditions which have contributed to the severance of the Mongols from allegiance to China. Whatever may be said of the attitude of Russia towards China in regard to Mongolia it must be admitted and remembered that the old régime in China treated the Mongols badly, particularly during the tenure of office of the Manchu Amban at Urga named Santo. He harrassed the Mongols, desecrated their religion and seized the horses from the Sacred Mountain to use in the Chinese army. In all their dealings, the Chinese treated the Mongols as a low race. The traders imposed upon their simplicity and made use of and cheated them. These characteristics obtained right through the country, and in Urga the way the Chinese despised the Mongols was quite obvious to any observer. In the shops the merchants showed them scant courtesy and cheated them like children. On the other hand, the Russians were on more familiar terms with the Mongols and treated them better than the Chinese, who had nothing to do with them except to employ them as servants or as herdsmen.

The idea of the Chinese while Santo was Amban was to create a powerful military force at Urga itself, where a cadre was sent; some sixty-five officers being detailed to build barracks and recruit Mongol soldiers with the object apparently of resisting a possible advance from Russia. It was the intention of China to garrison some 2,000 men at Urga by the end of 1911, and later to increase that number to 10,000, with garrisons of a lesser number at other cities like Kobdo and Tarabagatsi.

Barracks designed to accommodate 2,000 men were erected at Urga, but were never used for the purpose originally intended, the revolution which broke out in October of 1911 putting an end even to nominal control by China.

This military movement by the Chinese was watched carefully by both the Russians and the Mongols, and on the Russian Asiatic frontier conversation in 1911 was solely of war with China. Among the Russian officers stationed there vague ideas of China's rising power were entertained, talk continually being upon the establishment of a modern army and the expansion of railways. So far as the Chinese were concerned the force of some one hundred and thirty to one hundred and fifty thousand Russian soldiers distributed between Irkutsk, Yerkne Udinsk, Kiakhta, and Chita, together with the feverish duplication of the Siberian railway, and the old-time gradual advance of the Russian Central Asian frontier, were sufficient to cause them to foresee ultimate trouble with Russia over Mongolia, and this was accentuated by the repeatedly expressed desire of Russia to establish an undertaking with China not to colonise Mongolia, not to recruit Mongolian soldiers, and not to interfere in the administration of Mongolia. These points were insisted upon by Russia for one simple reason—a reason which puts the commencement of the "Mongolian Question" in a nut shell—and that is that the Manchu Government endeavored to create a new province in the east of Mongolia and notified Russia that as a section near Manchuria was to be considered as a province of China there could be no more free trade in that area as provided by the 1881 Treaty, and that duties henceforth would have to be levied as was the case with other provinces of China. In this lies the cause for the energetic measures on the part of Russia to prevent China from "colonizing" Mongolia.

According to the Treaty between Russia and China, signed in St. Petersburg on August 19, 1881, Russian subjects were authorised to carry on, as in the past, trade free of duties in Mongolia subject to China as well as in places and *aimaks* where there was a Chinese administration, and in those where there was none, in addition to towns and other localities in the provinces of Ili, of Tarbagatai, of Kashgar, of Urumchi and others situated on the northern and southern slopes of the Tien-shan (mountains) as far as the Great Wall. The regulations attached to this Treaty which set out the routes and governed the trade, stipulated that "a trade by free exchange and free of duty (free trade) between Russian and Chinese subjects is authorised within a zone extending for fifty versts (100 li) on either side of the frontier." In course of time in connection with the development of treaty privileges Russian merchants had undoubtedly invested large capital, and had accumulated large interests, and the Russian Government was all the more desirous of seeing protection extended to its subjects when it observed the military efforts of the Urga Amban and failed to obtain a reply to its demands from the Peking Government.

To the failure of the Manchu Government to enter into negotiations with the Russian government must be attributed the ultimate instigation of the Mongols to break away from China and enter into independent treaties with Russia.

The 1881 Treaty provided that at the end of each ten years either party desiring revision could open negotiations with that object, but not till 1911 did China make a move to secure the elimination of the free trade zone, which she deemed objectionable. She then submitted proposals to the Russian Government, and negotiations were opened in St. Petersburg, the result being the presentation by Russia to China of a set of counter proposals. This was on October 25, 1911, but China made no further move in the matter, nor did she answer the proposals of Russia, though pressed to do so from time to time.

A year elapsed, and in October, 1912, a year after the Revolution broke out, Russia presented a note to China traversing the position and abolishing the free zone. But meantime the Mongols had declared their independence from China, had sent a mission to St. Petersburg, had elected their own Emperor, and were in active consultation with the Russian Commissioner, M. Korostevetz, former Russian Minister in Peking, with the idea of completing an agreement with Russia.

The mission which went to St. Petersburg on behalf of the Mongols was headed by the powerful Prince Hanta Chin-wang, who had been harried by Santo, and had really fled from the Chinese. They were received by the Russian Government with open arms, were laden with honors, were supplied with munitions of war, and what was more, succeeded in inducing the Russian Government to accord "independent" Mongolia recognition and support on November 3, 1912, M. Korostevetz signing on that day with the Hutukht'u, the Urga Agreement and Protocol which are reproduced elsewhere in this issue. These instruments secured to Russia the rights she had long desired, and even much more than she demanded of China originally. In addition the Mongols gained, as Russia thereby undertook to help them maintain their autonomy.

The Hutukht'u, who was crowned Emperor, is the third highest in the Lhamaist hierarchy, the Dalai Lhama being the highest and the Tachi Lhama being the next; the two latter residing in Tibet. The Hutukht'u was born in the same year as the late Emperor Kuang-hsu, and, contrary to the laws and customs of Lhamaism, has a wife and children. He is a man of feeble intellect and is physically almost blind, though some report that his eyesight improved after the erection of an expensive temple at Urga to propitiate the gods. He has been visited by many foreigners, and his acquaintance was made by Mr. C. W. Campbell, formerly Chinese Secretary to the British Legation at Peking, who was on a mission to Urga in 1902. Incidentally it may be mentioned that Mr. Campbell was accompanied by Mr. F. A. Larson (now the Adviser on Mongolian affairs to the Chinese Republic), who was then the Swedish agent of the British and Foreign Bible Society, and who possesses a greater knowledge of Mongolia lying between Urga, Kalgan and Hilar than any foreigner living. Mr. Campbell became very friendly with the Hutukht'u, and, it is stated, the latter desired to secure his service as Adviser after the Mongolian declaration of "independence." The Hutukht'u is a man of very extravagant tastes, and Russian merchants sell him modern novelties at an exorbitant price. In his foreign-styled house at Urga he is surrounded by such modern inventions as telephones, motors, etc.

This newest of Emperors is known in Mongolia now as the Bogdo Khan (big Emperor). He has much influence amongst his fanatical followers, and, on account of his wealth, was able to command attention even in Peking. At first he was actually only Emperor of the four *aimaks* which form Khalkha, two eastern and two western, but observers now find that the allegiance of the two western *aimaks*, is, even at the present moment, very shadowy.

The Hanta Chin-wang, who is back in Urga from his mission to Russia, has sent out emissaries to induce other Mongolians to accord allegiance to the Bogdo Khan, and it is reported that they have been successful in securing that of Barga, the large territory of which Haila was formerly the chief town. The Ordos, too, are said to have recognised the Hutukht'u's authority and have expressed the desire to join Khalkha whilst the Silinhoa League has also joined. This brings the sway of the Hutukht'u conterminous with the Russian sphere in Northern Manchuria, as far as the Khingan mountains.

MONGOLIA.—Bogda Khan, the Hutukh'tu, who declared himself Emperor of Mongolia. He is of Tibetan origin and is about 45 years of age.

To protect themselves against the threatened invasion of the Chinese army the Mongols have exerted themselves to recruit a substantial force, and in the drilling and equipment great assistance has been lent by Russia. Since the declaration of "independence" Russian officers, some forty-five in all, have been attached to the Mongolian forces in Urga to give them Western training, and throughout the country the troops are active in preparations to defend their independence. Rifles are plentiful and cheap, the discarded Berdan rifles of Russia selling for three roubles each.

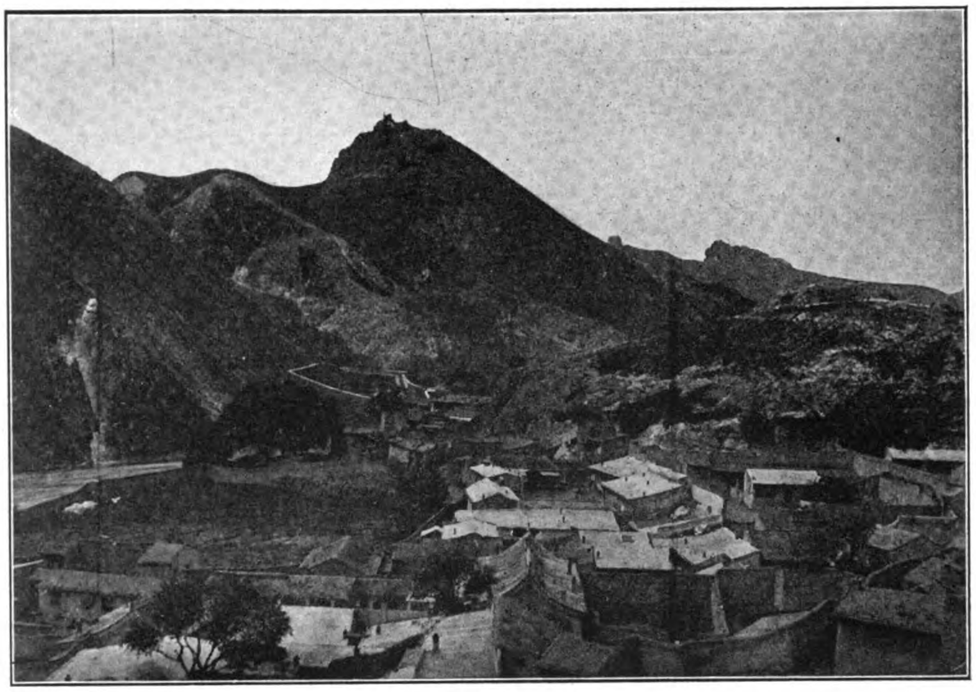
Early in February some 4,600 soldiers were moved from Urga south-eastwards, by the Northern route, towards Kalgan, and by May they were stationed as far south as 300 miles from Kalgan. So far no serious collision has occurred between them and the Chinese forces, and the authorities in Peking fear that if a collision does occur and results in a victory for the Mongols it will be an incentive for Mongols in Inner Mongolia to join with the victors from Outer Mongolia. It would also have the effect of awakening large numbers of Mongols of the four *aimaks*, who, it is certain, are as yet ignorant of the fact that they are no longer Chinese subjects.

At a dinner party given by President Yuan Shih-kai at Peking in the beginning of February to some 120 Mongols, many of them important men, the President explained the change that had taken place in the relations between the country they represented and China. Mongolia was, he showed them, to be placed on an entirely different footing from that which obtained when the Manchus ruled; and, judging from what the Mongols then said, it is certain that had it been generally known what had been contemplated the Urga Protocol would not have been signed.

It is particularly unfortunate just at a time when the conditions of the Mongolians were to have been ameliorated, when autonomy was to have been granted, and when they were to have been admitted to an equality with other members of the Chinese race, (as shown by the "Rules for the Treatment of Mongolia" promulgated on August 19, 1912), that Russia should have stepped in and prevented such a consummation.

The position now is that China has not yet given her consent to the Urga Protocol, though she is being pressed by Russia to secure Parliamentary sanction to the Agreement between the Chinese Government and Russia which largely acknowledges the Urga Protocol.

The Mongolians themselves, however, are already beginning to have qualms as to the wisdom of their precipitate action in giving so much to Russia, and already a considerable number of Mongols of the four *aimaks* have come back to China, one Prince, Wu Tai, returning not long ago with 800 trained men. Even in Urga concern is publicly being shown, and so great was the trepidation about the middle of May that the Mongols held a conference to discuss the question. That conference decided that if they were to recognise the sovereignty of Russia their country would undoubtedly be engulfed and on the alternative if they were to recognise Chinese sovereignty the Republic would attempt resubjugation. It was therefore resolved to steer a middle course and maintain friendship with Russia so long as that Power did not transgress Mongolian interests. The Minister of the Interior and the Da-la-ma, who were at the conference, declared that having freed themselves from one yoke they must not fall under another, but must try by all means to obtain complete independence. This of course is what



MONGOLIA.—A View of Kalgan.

Russia professed to wish to aid Mongolia to do. The Hutukht'u seems to have resented open talk on this question, and at a conference of Ministers, over which he presided, he expressed indignation that they should quarrel about "insignificant questions," and thereby provoke the dissatisfaction of the Russian representative! This remark was made at a time when it was known that the newly appointed Russian Consul to Urga, M. Miller, was on his way to Mongolia conveying presents from the Czar of Russia to the Hutukht'u!

Perhaps the most interesting question is, What is Mongolia? The Russians in their Treaty speak of "Mongolia," but they have semi-officially announced in St. Petersburg that the Treaty was meant to cover Outer Mongolia only. According to geographies Mongolia is bounded on the north by the provinces of Trans-Baikalia, Irkutsk, Yenesei, and Tomsk; on the west by the provinces of Somipolatinsk; on the south by Sinkiang, Kansu, Shensi, and Chihli, and on the east by Manchuria. The greatest length is given as 850 miles, and the distance from east to west as 1,500 miles. This territory is divided into Outer and Inner Mongolia, which in turn are divided into nine main divisions, with still further divisions supervised by small Mongol princes, the boundaries of which are well known to Mongols and travellers alike. The actual boundary between Mongolia and China is difficult to locate, the inhabitants themselves not seeming to know where China ends and Mongolia begins, though the actual line between the Chinese settlements and the Mongol country is clearly enough marked for cultivation ceases where the Chinese cease, for the Mongols do not cultivate. They are nomads who are experts in the management of herds and in certain kinds of transport. They locate themselves where the water and the grazing are best, and shift their residences with their herds. There are, comparatively speaking, few towns and practically no villages in Mongolia, the chief towns being Urga, Uliassutai, Kobdo, Kuldja, Khiakta, and Tarbagatai, though the latter is of consequence only from a military point of view.

The Domination of Russia

The whole road from Urga westwards through Uliassutai and Kobdo to the frontier past Chugutschak is virtually in Russian occupation. By treaty Russia has the right to station Consular guards, at posts where she has Consuls, and she has the right to station Consuls in places where her trade permits it. She has thus a chain of Consular guards stretching from Urga westwards to Chugutschak, on the utmost western frontier, south from there through Ili to Kashgar, and, what is more important, to Urumchi, the capital of Sinkiang, or, as it used to be called, the New Dominion, where the two roads from Chugutschak, Ili and Kashgar converge.

From Urga eastwards the roads goes to the Barga territory, which is under Russian occupation. There are 10,000 Russian guards northwards, and a great Russian force at Kiakhta. The boundary, in fact, runs through that town, which is divided into Mongolian and Russian. Formerly there were 250 Chinese troops stationed on the south side and 6,000 Russians on the north, while the latter had a force of some 175,000 within easy striking distance, at Yerkne Udinsk.

Russia, by the new treaty, is compelled to support Mongolia, and when the Chinese airily talk of attacking the Mongols it means she would have to attack Russia also. How ineffective any move on the part of China would be is indicated by the fact that for her soldiers to reach Urga alone they would have to march 28 days across the Gobi desert, over which everything would have to be carried. From Urga to the Russian frontier, is only seven marches, and except in winter that region can be reached by steamers on the Selenga river which could transport large bodies of troops from the Siberian railway. In course of time, too, a railway will connect Kiahkta to Yerkne Udinsk, but in case of necessity it is claimed that the latter place possesses facilities in the shape of a subsidised ironworks which could, within a month, turn out sufficient rails to enable a light railway to be laid to Kiakhta. While China was thinking about it Russia, if she had the need to, could put two to three hundred thousand men in Urga.

China realises the futility of fighting for Mongolia under the circumstances, and, in response to alarming telegrams to Russia and Mongolia saying that she was

MONGOLIA.—General View of Urga.

MONGOLIA.—The man seated is Tok Tan (his title is Tai Chi), Commander-in-Chief of the Mongol troops. He was a notorious robber chief, and assisted the Russians in the war against Japan.

making vast military preparations for an advance into Mongolia, has made a statement that such is not the case. In fact she is withdrawing troops which were sent to Kalgan to protect the frontiers against Mongol raiders.

Present Conditions in Urga

So much interest is being centered for the moment in Mongolia that no excuse is needed for giving further details of conditions in the country, and in this regard we are fortunate in being able to reproduce information from a competent observer who was on a visit to Urga in March last.

This gentleman started for Urga from Yerkne Udinsk, and it is the result of his observations which we are able to present to readers. He travelled to Kiakhta in a Russian cart along the frozen bed of the Selanga River, covering the distance in from two to three days. At Kiakhta it was found that the Mongols had taken over the telegraph line between that city and Urga after the conclusion of the agreement with Russia, the telegraph office being managed by the Mongols with the assistance of Russian operators. The post office was, however, still in Chinese hands, and was the only Chinese Government institution that had not been interfered with by the Mongols.

At Mai Maichen, the Chinese commercial portion of the city of Kiakhta, the majority of the Chinese merchants had closed their shops, and the place presented rather a deserted appearance. At the northern suburb of Kiakhta, Troitzecasavsk, a Russian Customs House handles the incoming and outgoing merchandise. No tax is charged on Russian goods entering Mongolia, or upon Mongolian native produce such as ponies, cattle, wool, skins, etc., though a heavy charge is made upon Mongolian goods such as silk, tea, and hand-made articles, and upon Chinese products, the charge being levied according to the Russian European tariff.

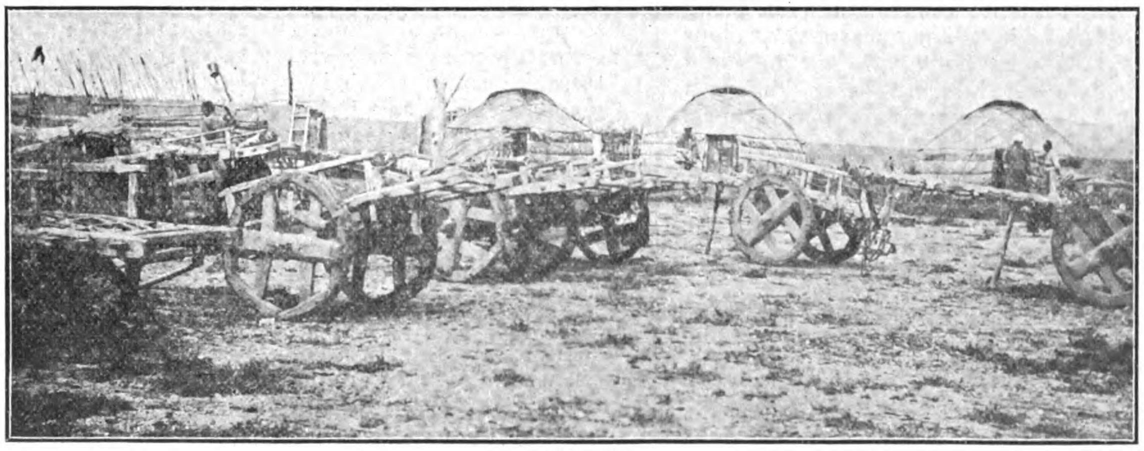
THE JOURNEY TO URGA.

The journey from Kiakhta to Urga is divided into twelve stages. The first is made with three horses harnessed to a carriage, driven by a Russian driver. The remaining eleven are made in a style peculiarly Mongolian. The horses are unharnessed and the Mongols attach a pole by ropes crossways to the shafts of the carriage. They then mount their ponies and two of them ride behind the pole, which rests against the chests of the ponies. Six or more Mongols, including women and children, mounted, and leading spare horses, accompany the traveller, and at frequent intervals relieve one another. In this manner the journey is covered at a gallop, up and down hills, across plains, prairies, boulders, rocks, snow and ice. Nothing comes amiss. It is a wild and nerve-racking experience. When descending an especially steep hill the carriage is taken down sideways, with Mongols on hand at either side to prevent it toppling over. Half way down Mongols, ponies, and carriage let themselves go, crashing, bumping, and jolting over everything. Such an experience might be gained riding into action seated on a gun carriage!

On arrival at the end of a stage an amount varying from three roubles upwards is paid, and upon producing the "huchao" (or permit) the traveller is handed over to the next stage. Three days and nights are thus occupied, sleep being had in the Mongolian tents, or "yourts," made of felt and woodwork—most primitive and uncomfortable shelters in the cold months.

THE FEATURES OF URGA.

On approaching Urga from Kiakhta on the north-west side one passes the native Mongol city of Kurin, the most striking feature of which is the temple enclosing the gigantic Buddha nearly 1,000 feet high, made of brass brought from Dolonor, and inlaid with precious stones. The temple was commenced about four years ago when the Hutukhtu was suffering from very bad eyesight, and was



MONGOLIA.—Mongolian Bullock Carts with yourts (tents) in background.

built to propitiate the gods in order that they would be pleased to restore his sight. It has only been completed lately, and thrown open to the public. And the Hutuktu's eyesight, though still very weak, has recovered!

In Kurin are situated the "Gands," or University buildings, which are surrounded by monasteries giving accommodation to 10,000 professors, priests, and scholars The education that is provided is chiefly from the books of Buddha, and is conducted very largely by men who have graduated at Lhassa, the Thibetan language being used.

The procedure of examination is extremely curious. The candidates, who must have attained the age of fifty years, sit in the middle of the hall, wearing yellow caps and gowns. They are then cross-examined by their fellow-students, who approach them up a centre aisle, shouting questions at them, clapping their hands, and gesticulating wildly within a few feet of the faces of the candidates. Curious questions are asked and debated. One question, for instance, is: "Does the mountain called Butung Burn, mentioned in the book of Buddha, rest in the ocean or on the ocean?" Another is: "What is the difference between a man sitting on a tree and a man standing on the ground?" The examiners sit behind the candidates and record the questions and answers in bulky looking books.

These ten thousand men are not allowed to marry, and have to devote their whole lives to this kind of learning. The idea of the Chinese was to turn them all into soldiers, a more sound and wholesome occupation than their present existence.

After leaving Kurin the traveller sees in the distance on the south side of the city, under the sacred mount of Gobdo, the palace of the Hutukt'u. The gentleman who made the journey describes him as a very pleasant man, who introduced him to his family, among whom was the ten-year son, Prince Sed Sen-han, whose estate is one of the largest in Mongolia, and is being administered for him while he is receiving his spiritual education from his spiritual father in Urga.,

In a temple nearby is the mummy of the Lhama who was the spiritual adviser to the 7th Hutukht'u (the reigning one being the 8th.) The Lhama was a very pious man, and so his body was embalmed and gilded whilst in his chair—as is done with Buddhas—in the temple in which he lived and died, his cap and gown being on a chair close by. The gruesome relic is much worshipped by the people.

In a northerly direction is the temple where the Hutukt'hu gives hisofficial blessings to pilgrims, undertakings, etc. Here is the Court in which he was recently crowned temporal ruler. The three thrones are kept just as they were when the coronation took place. They were then occupied by the Hutukht'u, his wife—a good looking woman who speaks a little Chinese—and his eldest son, who was crowned as his successor.

Proceeding eastwards the Margot Customs House is passed, and further on the so-called Russian Concession is reached. Still further on is the Mongol prison, surrounded by three spiked pallisades. It is a relict of barbarous times which ought to be suppressed without delay. Prisoners condemned for whatever fault soever, and in some cases when waiting for trial, are placed in a crouched up position in a wooden coffin from which their heads and arms can alone protrude. These coffins are placed in a dark prison, half underground, and the miserable inmates are kept there without being released until their sentences are served or death intervenes. The sanitary conditions that must prevail beggar description.

Next door to this prison is the hospital, and about a mile beyond is the Russian Consulate-General with church, cemetery, and attendant buildings.

MONGOLIA.—A Grand Lhama of Mongolia.

About two miles to the south-east on the road to Kalgan and the Gobi desert is the Chinese city of Mai Maichen. To the north-east of this city, and five miles from the Consulate, is the Cossack camp, adjacent to the buildings erected for the accommodation of Chinese troops, and now occupied by Mongol recruits.

On the south side of Urga stretches the river Tola, and beyond this is the sacred mountain of Gobdo. This mountain embraces a dense forest in which all animals and birds are sacred. Bears, wolves, leopards, wild cats, foxes and deer are said to swarm at will, a strict law being enforced against killing them. The mountain is wild and difficult to climb, and the journey is rarely undertaken by Russian residents in Urga, even when the paths are not obscured by snow.

THE CHINESE IN URGA.

There are upwards of 10,000 Chinese scattered about Urga, some living in Kurin, others in Mai Maichen. They are not interfered with, and are allowed to carry on their usual avocations.

The Chinese Post Office is in Kurin, and although attempts have been made by the Mongols to suppress it, it does a good business. Courier services are maintained with Kalgan in the south and Kiakhta in the north, Mongols being employed as carriers. It is interesting to note that two clerks who had been sent six months previously from Manchuria were not allowed by the Mongols to remain in the city, because they had no queues.

The Chinese Telegraph Office was taken over by the Mongols after the signing of the agreement with Rusisa in November, 1912, the Chinese employees being superseded by Mongols, assisted by Russian operators. A branch of what used to be styled the "Ta Ching Bank" exists in Mai Maichen. This bank was started with a private capital of Taels 2,000,000, of which it has lent the Mongols about $700,000. This debt is still outstanding, and, at the time of the declaration of independence, the Mongols wished to close the bank and so cancel their debt. The Russians, however, pointed out that such an action would not be allowed. Paper notes, for use only in Mongolia, were issued when the bank commenced business. They have fluctuated much in value since the separation, and have reached as low a value as ten cents for a paper dollar. At the present moment, the Mongol Government has given orders that the Customs House is to accept the notes at a third of their value, viz. about 40 cents per dollar.

The Chinese troops, who, to the number of 250, were formerly quartered at Urga, surrendered after the separation to the Mongols, and handed over their arms of their own free will. This cowardly behaviour was largely due to the weak conduct of the Amban Santo, who without attempting to make any resistance, fled to the Russian Consulate and begged for protection. He and his men were subsequently deported to China, via Kiakhta, and were thus ousted without any blood being shed.

The Chinese merchants at Urga, as in every other part of the world where they trade, being content with small profits, continue to do good sound honest business, and need not fear competition from the Russians, whose main idea is to get rich as quickly as possible by charging the Mongols excessive prices. Chinese cooks and house boys are to be found in employment, the Hutukht'u and Toch-to-he-gun the commander of his guard, having Chinese cooks.

THE RUSSIANS IN URGA.

Amongst improvements introduced at Urga by the Russians is a hospital which is maintained by the Government. The staff consists of a doctor and Buriat assistants. Chinese and Mongols are admitted free of charge.

A telephone has lately been installed between the Russian Camp and the Con-

MONGOLIA.—The Gobi Desert.

sulate. The Officer in charge wished to extend it to Kurin, but objections were raised by the Mongols that it would interfere with their religious processions!

A monthly newspaper, printed in special Mongolian type, under the supervision of Russian printers, has also been established. The first number was issued during March and contained articles on general subjects, education and politics, and had no attacks on China.

A school was instituted for the sons of Mongols. The Russian and Mongolian languages are taught. The headmaster is a Buriat named Tam Sorano, who graduated at St. Petersburg University, and is supported by trained Mongol assistants. The school was started with much difficulty about a year ago. There are at present about 12 pupils. The Russian Government have granted a subsidy and are now building suitable premises.

As has been mentioned there are about 1,000 Russians in Urga, the majority of whom are merchants, whose main idea is to accumulate money as quickly as possible at the expense of the Mongols. As an instance of this, after the Hutukht'u had been crowned, he wished that all his subjects should see his photograph. Accordingly arrangements were made for several thousand copies of his photograph to be printed in Moscow. The actual cost to the merchant who undertoock the contract was 15 kopecks per copy, whereas the sum charged to the Hutukht'u was one rouble. A Russian merchant in lamenting his lot at Urga is said to have stated that he must console himself for only making 20% on his business with the Mongols by considering himself patriotic. If 20% is the limit, what must the maximum profit be?

The Mongols tax all Chinese goods 5% in order to obtain revenue.

MILITARY MATTERS IN MONGOLIA.

The Mongols are said to maintain about 200 troops between Urga and Kiakhta, but unless the men who supply stages are termed soldiers, there is no evidence of their existence.

At Urga, there is a Chief Russian Instructor, assisted by sub-instructors. They have already drilled and equipped 600 Mongol troops, who are distributed at various places in southern and western Mongolia.

At the present moment, there are 200 recruits being drilled. They are armed with the old style Russian rifles and long cavalry sabres, and their appearance is slovenly in the extreme. They wear no uniform and drill in their native boots. They are, however, good shots, and, of course, excellent riders, and will probably make good scouts. Trained soldiers, in the accepted sense of the term, they will never become.

To the credit of their instructors, be it said, they carried out various evolutions, rifle exercise, sword practice, company drill, etc., with zeal and alacrity. They are housed in the old Chinese barracks adjacent to the Russian camp. Besides these men, the Hutukht'u has a bodyguard of 200 mounted men, under the command of a celebrated Toch-to-he-gun, to whom reference is made later.

The Russian military force now at Urga, consists of approximately 300 Cossacks from Yerkne Udinsk, with two machine guns and a portion of a battery of artillery with two guns. A small force of 300 men has been recently sent to Uliassutai and 50 to Kobdo.

It is rumored that reinforcements will shortly proceed from Troitzecasavsk to Urga and Uliassutai respectively. The report that the Russians have induced Barga (the district of which Hailar is the centre) to join the Mongols, is not true.

PROMINENT PERSONALITIES AT URGA.

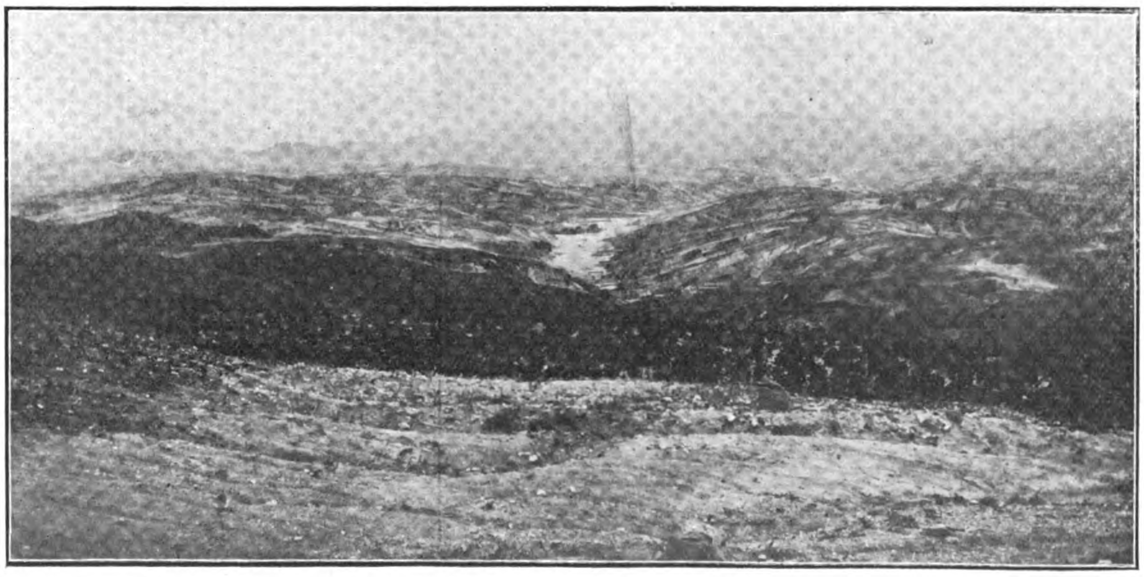
The Hutukht'u: Jab-Sun-Dam-Bar, or Bogdo, or Edsenhan. A man of about forty years old, who has weak eyes and wears blue spectacles. His wife, of about the same age, possesses great power, and influences him in no small degree.

The Mongolian Cabinet.—

President—Prince Sain Noin: An intelligent man who is the mainstay of the Cabinet. He joined the Cabinet in July, 1912, and succeeded Da-la-ma.

Minister of the Interior: Da-la-ma. Chief Lhama of the Monastery; an honest man; one of the deputies sent to St. Petersburg to ask for assistance in 1911.

Minister of War: Da-la I-van (van signifies Prince). A synologue very much



MONGOLIA.—Near the Gobi Desert.

interested in the arts; without any military influence or importance; employed as Minister because he was one of the first Princes to advocate separation from China.

Minister of Finance: Tu-shih-t'u-van: Honest but has little or no influence.

Minister of Justice: Nam-sarai-kung: A boon companion of the Hutukht'u, with whom he has much influence: possessor of hereditary property on the Russian frontier near Lake Baikal.

Minister of Foreign Affairs: Hanta Ch'in Wan: Leader of the deputation sent to Russia in 1911. Very pro-Russian: now Ambassador to St. Petersburg, and recently decorated with the order of St. Anne.

Minister of Shabeen: Shan-tzot-ba. Opposed the declaration of independence and the agreement with Russia; was deposed and sent into exile by the Hutukht'u; since returned. His post is a sinecure, and he has no influence. Under the Chinese régime was Minister of Finance.

N.B. The Shabeen are 150,000 Mongols who pay personal tribute to the Hutukht'u.

All Ministers are supported by under-Ministers who are, for the most part, southern and eastern Mongolians, and not Halkar or outer Mongolians. The under-Ministers possess brains and intelligence, and the Ministers are inclined to be jealous of their influence.

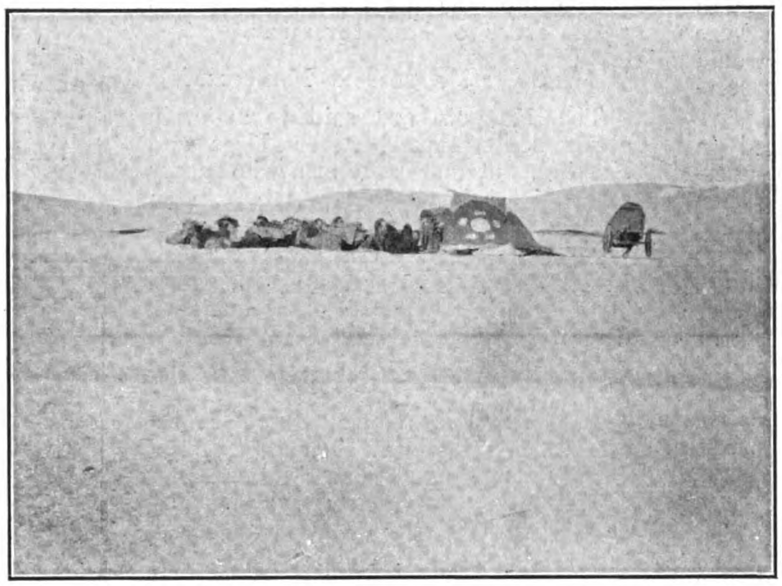
Perhaps the most influential of them is *Prince Dam Din Surung*, Assistant Minister of Foreign Affairs, who was military commander of the Mongols at Kobdo when the Chinese troops were turned out in August, 1912. He is enterprising and has initiative and comes from Barga, in Eastern Mongolia.

Udai, Prince of Genin: His principality is on the northern border of Manchuria, north of Toanan-fu. He was expelled by Chinese troops, who, it was currently reported at Urga, killed men, women and children. Most of his subjects fled to Barga, whilst he and his wife came to Urga. He is now in receipt of a pension and has the post of assistant Minister of Justice. He has protested so far without avail, against the barbarous prison system in vogue.

Hai Sun Gun: Another Assistant Minister; belongs to the party of Da-lama; formerly had much influence; was one of the deputies sent to St. Petersburg in 1911.

Toch-To-He-gun: Chief of the bodyguard of the Hutukht'u, which consists of 200 men who have followed his fortunes from Southern Mongolia. He has had a varied career and is famous as a robber chief. He is said to have been driven to pillaging owing to the persecution he has received at the hands of the Chinese; was eventually allowed by the Chinese to settle in Trans-Baikalia, and was on the point of becoming a naturalised Russian when Mongolia declared independence. He therefore hastened to Urga to offer his sword and his service to the Hutukht'u; has nothing officially to do with the Mongolian army now being trained by the Russians.

Mr. Muskuitin: Was a member of the Russo-Asiatic Bank when that institution opened at Urga in 1906; is a good Mongol scholar; helped various princes with loans, and through no fault of his, the bank lost about 400,000 taels, through false chops being impressed on receipts; the Bank was then closed; he was a councillor to the Mongolian government when independence was declared; is now in Russia, having a concession from the Mongol government to raise funds in order to start another bank at Urga.; was formerly a correspondent of the *Novoe Vremya;* the present correspondent is Mr. Griarsz-Novken, who is also chief of the Russian Printing Office, and a lay reader in the Russian Orthodox Church.



MONGOLIA—A Caravan at Rest.

The Mongolor Mining Company: In 1896 a concession was granted to Mr. van Grotte by the Chinese government and the Mongolian princes Sed-sen-han and Tu-shih-tu. After the declaration of Mongolian independence Mr. van Grotte resigned his interest in the company and left Mongolia. The management is now in the hands of a new director, Mr. Pokrofsky, with Mr. Dambrofsky as sub-director, who was sent from St. Petersburg. He made a new agreement with the Central Mongolian Government for, it is said, twenty years; the conditions hitherto obtaining have been renewed and the dividends distributed among the shareholders, mostly Russians, the Mongolian Government receiving 16½%. The mine is situated on the Ero river, about 100 versts north of Urga, and continues to turn out much gold; the workmen employed by Mr. van Grotte were mostly Chinese, who are still retained. The mining company has the finest building in Urga. It was built by a Swedish engineer employed by Mr. van Grotte, and is fitted out very comfortably, even having a billiard table. It is in direct contrast with the Russian Consulate, which is a poor and oldfashioned building, not in keeping with the importance of the post.

Besides numerous Russian merchants, the British American Tobacco Company is represented by Mr. Marnan; and a brewery has lately been established by Mr. Bruno Hinrich, an Austrian.

GENERAL REMARKS.

The condition of Mongolia in general, and Urga in particular, at the present time is crying for reform. The people are primitive and mediæval, and under Chinese rule were left to themselves, and so have never progressed in civilization.

Mr. Korostovetz does not claim that Russia will be able to work a miracle and turn such a people into civilized beings all at once, but since the conclusion of the treaty he has been doing all in his power at Urga to bring the Ministers and higher officials to realise the true condition of their country. In particular he has instanced the hideous condition of their prison system, and the almost ludicrous ideals set up as their University standard.

One hears of old and sick people, no longer able to work, being turned out of their yourts (tents) and left on the hillsides to die, or be eaten alive by the dogs, which can be seen even in Urga itself, devouring corpses.

It is stated that in December, 1912, the Buriat Dordjiev arrived on a mission from Lhassa, and succeeded in making an arrangement with the Hutukht'u whereby the Mongols recognised the independence of Tibet, and *vice versa*. He also endeavored to enlist Russian assistance with the view to the creation of a joint Anglo-Russian protectorate over Tibet. He is now in St. Petersburg.

In conclusion it is obvious that Russia is very much in earnest in her desire to assist the Mongols in every possible manner, and if China persists in her policy of endeavoring to win back Mongolia by force of arms, there can be only one result, viz., friction, and possibly conflict with Russia.

From Kalgan To Urga.

That extensive portion of Mongolia lying between Kalgan and Urga is generally believed to be nothing but a desert. Until recent years, it was believed that the crossing of this desert was to face almost insurmountable difficulties. As a matter of fact to call this country a desert is a

misnomer. It is, in some parts, sandy, dry and arid, but practically on the whole route there is food for stock.

The Mongolians have called it the Gobi. (gobi meaning desert), but in comparison with the Sahara and other deserts, it is almost a garden. Travellers can cross without practically any difficulty except that they have to carry stores. Water is abundant most of the way, wells being frequent, and only on one or two marches must water be carried. It is probably due to the laziness of Mongols that there are not more wells en route, but as it is there are wells every ten miles or less, except at two places where water must be carried for 24 hours. In addition to the wells, ponds formed by snow or rain are to be found all along the road. These are used by Mongols for watering their flocks. As has now become generally known, Mongolia is famous for its tremendous grazing areas, and flocks can be fed and sustained on country thousands of miles in extent. In fact, the Mongols have so adapted themselves to take advantage of the natural supply in the nature of grazing that they deal with horses and cattle to the exclusion of cultivation. The character of the country in this respect and the climate have combined to make the Mongol a nomad. Of the climate of the Gobi it may be said that it is one of great extremes. After rain or with a north wind, the cold is extreme, even in June, and one day fur coats may be necessary even in the middle of the day, walking or riding. On the other hand, the next day may be excessively hot in the middle of the day; but the night would be cold. At Urga the mean temperature is said to be about 42° F. The coldest month is January when the thermometer is at zero and the warmest month is July with a temperature at 82°. The climate, further north toward Kiakhta is pleasanter, and, in July, superb.

There are very few towns or villages in the country, because the Mongol folds his yourt whenever he is prompted to do so and pushes off to some other area where grazing is better for his flocks or the temperature is more congenial for himself. Occasionally a collection of Mongol yourts is met with, and that is the nearest approach to a village. Whilst such a village may be encountered at one place one day, it is likely to be in course of very short time somewhere else far removed.

The road from Kalgan to Urga practically keeps to the telegraph line though it deviates occasionally one or two miles to either side. The names of the localities seen on the maps do not necessarily designate any human habitation. They may represent families living far apart or they may be due to some incident which happened at the spot. The names are well known to the Mongols, are well located, and useful in determining distances, which are usually calculated from a well in one district to a well in another. The only permanent places, so far as inhabitants go, are the three temples and three telegraph stations passed en route.

The journey from Kalgan to Urga may be comfortably covered in 25 days.

MONGOLIA.—Mongolian Cavalry drawn up outside Urga, awaiting the arrival of the newly proclaimed Emperor, who rode through the lines.

THE ROADS FROM KALGAN.

There are three great roads leading from Kalgan into and across Mongolia, with their various branches.

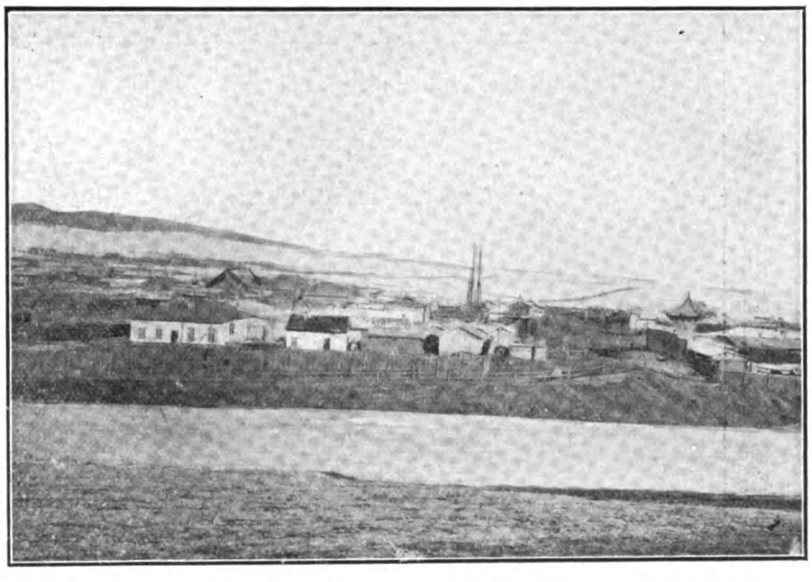
The best known is the *Chinese Government Relay Road,* which runs to the west and then across the Gobi. This road is joined after a few hundred li by a road running from Kuei-hua-cheng, and, at Sairussu, sends a branch to Uliassutai, Kobdo, and to the west. The main road moves on to Urga, and was the one used by the Chinese officials.

The next road is the *Caravan, or Telegraph Road.* This road is little used by passengers, and is the chief and most direct route for commerce. In this direction the postal carriers travel, but the line they take does not actually follow the road, but runs across country varying according to the positions of the troops of horses from which couriers obtain their changes of horses, which again vary according to the state of grazing. The Chinese Imperial and the Russian Post both use this line. The road itself also varies considerably, the carters and camel drivers idiosyncrasies, the season of the year, water, etc., all combining to alter it. It is used by the camel caravans, the horse traffic (both cart and saddle), the donkey transport, the tramps, and sometimes the ox carts, when grass is good.

The third main road runs to the East and takes a great curve, returning again to the North-west until it cuts the Telegraph Road some 25 miles from Urga, and, combining, they run over the Tola river into Urga.

This road is used almost exclusively by ox-carts. It is chosen owing to its flatness, and therefore easier going, which enables the oxen to travel by night and feed by day. It also varies according to the season of the year, as the grass is good or otherwise.

From Urga north to Kiakhta there are only two definite roads, one running practically due north, the shortest, which is the Relay Road, used by ox-carts, camel



MONGOLIA.—General view of Kiakhta (Mai Maicheng) Commercial Town.

caravans, etc. The other runs to the North-east. This is the Russian road, used by the Mongolor Societé (Gold Mining Company) as their relay road, and by the Russian post.

The methods of transport actually in use at present are: Camel pack, camel cart, ox cart, horse cart, pack donkey (mostly used by Chinese tramps and coolies), riding horse, and palanquin carried on poles by horsemen. It is exceedingly difficult to estimate the actual cost of any one of these sources of transport. They all vary, according to the supply and demand, and the actual time taken on the road; the quicker the dearer, the smaller the load the cheaper; and travelling from Urga to Kalgan is cheaper than from Kalgan to Urga, owing to its descent nearly the whole way.

Roughly the cost and speed of transport along the Telegraph and Ox Road are as follow:—

Camel pack: 18-35 days, $20-$30; 350 to 500 lbs. load.

Ox-cart: 43-75 days, $10-$15.

Horse cart: (3 or more horses), 23-35 days, $80-$150; maximum load with four horses, 1,000 lbs.

Donkey pack: 25-35 days.

Riding horse, 12-30 days; cost variable. The same horse all the way, $30 to $40.

On the Government Relay Road, animals cannot be hired, a "pass" being the only method of obtaining them.

By relay riding the journey takes from eight to seventeen days and the palanquin about 17 days.

From Urga to Uliassutai by relay takes 8 days and from Urga to Kobdo by relay, 15 days.

Ox-cart from Urga to Kiakhta, takes 2 to 15 days travelling at night.

Merchants, etc., travelling, use a camel cart, a comfortable conveyance in which they sleep at night. The cost second hand of such a cart is $40-$60, new $100-$200. The Post Office horses across the telegraph line complete the journey, changing horses, in 7-9 days.

A Mongolian riding one horse and leading another will complete the journey in 10-12 days across the telegraph line. The journey from Urga to Kalgan is naturally the quicker, being on the descent most of the way.

A Chinese coolie carrying his pack or using a wheel barrow between two coolies, sometimes putting up a sail, will complete the journey in 20-30 days.

Oxen and camels during the hot season travel at night. As a rule all animals live on the grazing during the journey. At times Kalgan beans are carried, but used very sparingly. Water is fairly plentiful along the road from wells, ponds, snow, etc.

Colonisation by Chinese

As the question of colonisation of Mongolia by Chinese is made a feature of the demands of Russia it is interesting to give some idea of what has been done in this direction. A traveller thus gives his observations whilst travelling from Kalgan to Yerkne Udinsk:

As the road from Kalgan reaches Han-no-pa and moves on to the plateau one comes into the rich Chinese settlement. Here, for miles on each side of the road, are scattered neat Chinese farm houses with an occasional small village, with the usual Chinese shops and inns. The Chinese here have made use of the rich soil, and there are large stretches of cereals. Every year the cultivation increases, and instead of small patches of intensely cultivated ground as seen near Peking there are extensive stretches of cultivation. As a herdsman the Chinese settler fails, and the herds of oxen, sheep, and horses seen cannot be compared with those of the Mongols further north. The troops of horses belonging to the Chinese are of a very inferior sort, and obviously the Chinese do not understand the care of horses.

MONGOLIA—Camel herd on the grazing grounds.

After leaving the Chinese southern settlement no more cultivation is seen until the rich valleys beyond Urga are reached, though it seems evident from the vegetable gardens belonging to the clerks at the telegraph offices at Ude and Tuerin that cultivation of the lower ground might prove a success even in those dry localities. At Tuerin there is a succession of fine valleys very rich in grazing and watered by the snow and rain fed streams.

At Urga itself there are a considerable number of vegetable gardens but no cultivation on any great scale. It is stated that in this valley the cold winds prevent any successful cultivation. Northwards from Urga, however, Chinese, mostly from Shansi, have settled in the valleys, and work their farms with Chinese laborers, while Mongols are employed to tend the herds and troops of horses. The majority seem to be prosperous, with large houses, stacks, granaries, etc. Many of these large farms are capitalised by merchants in Urga, who either let the farms or else put a manager or bailiffs into them to look after them.

Scattered here and there are groups of Chinese who survey the farms and settle boundary disputes. The land is rented by the Chinese from the Mongolian princes interested. The colonist is allowed to choose practically what land he likes and pays about four dollars a ching a year in rent. He can leave the land and move on to fresh areas if it should prove unsuitable; otherwise he can hold the land in perpetuity. The colonists come directly under the officials at Urga, who settle any disputes.

Certain conditions are imposed which require the colonist to make some attempt at cultivation within a certain time, to build houses, and treat the Mongols properly, etc.

The grain is sold in Urga and Kiahkta, but it is poorer than the grain grown in China. A curious variety of wild oat, said to be huskless, is used considerably.

On the whole the Chinese colonist seems very prosperous.

Across the Yero river, in the north, are a number of Russian colonists, but they are not generally prosperous. Whereas the Chinese import their own people for the farms the Russian depends upon the Mongolian and as he is not a good agriculturalist the result is not as satisfactory as is the case with the Chinese.

As has been mentioned the flocks and herds managed by the Mongols are superior, but there is considerable difficulty in buying from them as they are not at all inclined to sell and do not breed for a market. They will sell sufficient to provide themselves with any necessaries of life which they do not produce themselves. But a Mongol is counted rich according to the number of flocks and troops of horses which he possesses, and only the worst specimens as a general rule come into the market.

The Mongol pony is an extraordinarily hardy animal, seldom more than 13.3 hands high, and often much smaller. He will cover long distances in a wonderfully short time, on grass alone. He is never fed on grain, and picks up his living from the grazing, an easy enough matter in the summer months, but one of great difficulty in the winter when the ground is snow-covered. The Mongolian, with the exception of occasionally cutting grass and placing it in a hollow bit of ground, never thinks of providing for his horses in winter, and will let them go for four days without water. A Mongolian pony can be ridden or driven in a cart for a day

and half without water, and will cover 700 miles in twelve days, being ridden.

The usual method among the Mongols when they sell horses is to dispose of a "bloc" of them to one of the dealers, who sorts them into good, bad, and indifferent, and sells them accordingly on reaching China.

The Mongol looks down on all kinds of commerce, and even upon cultivation of the ground, and it therefore remains for the Chinese to develop the country.

Commercial

The trade betwen Mongolia and Siberia has from time immemorial been a brisk one. The treaties of Nerchinsk (1687-89) and of Kiakhta (1727) regulating the Chinese-Russian frontier question made Kiakhta the main centre of mutual commercial intercourse in 1729.

MONGOLIA.—The Pasture Lands.

Both Mongolian and Chinese products entered Russia here. Payments were then made in kind. Tea, sugar, silk, etc., from China, being exchanged for cattle, skins, furs, hair, and wool from Mongolia, which again were exchanged for cloth, iron, and copper ware, opium and rhubarb from Russia. This system of exchange still holds good in some places in central Mongolia, where money is little used. For about sixty years the usual payments have been made in silver.

The tea-carrying trade was the most successful, and many Russian firms grew rich from it, but for some years this trade has been declining. The opening of the Odessa-Suez route giving connections between Russia and Turkestan, via Samarkand and Kashgar, and eventually the opening of the Manchurian line, combined together to give the tea trade its practical death blow. There is still a certain amount of carrying tea trade with Russia, the word "Kiakhta" having a magic effect upon some customers, and other Russian firms are still awaiting the opening of a railway line, keeping their houses open at Kiakhta, though the trade no longer passes by this route. Until very recently the Chinese import trade with Mongols was the most flourishing and the Russians, who always want a large profit, seemed unable to compete with them. The Chinese supply the simple Mongol with all the necessaries of life, such as cloth, caps, tobacco, sugar, silk and brick tea, charging exhorbitant prices. Metal ware, silver ornaments, tea pots, etc., are nearly all of Peking make, as are the wooden bowls in common use. In addition a considerable amount of Russian cloth is sold.

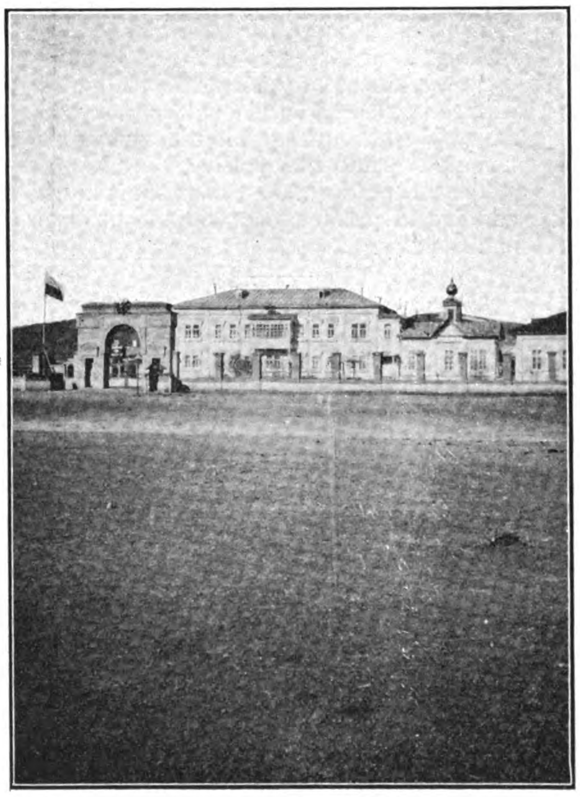
The Chinese have various small retail traders in the desert, some permanent as at Tuerin, others "travelling," each returning to the same place for a length of time, when the surrounding Mongols come in to buy.

Kiakhta received a heavy blow in 1909 through the abolition of Article 959 of the Russian Duty Tariff, and in consequence silk now pays ten roubles duty.

There is a brisk trade in cattle, but rinderpest is a scourge. The Russians have established an inoculation station north of Kiakhta, of which the Mongols make use. The average price of sheep and cattle is from two to eight roubles and from 25 to 45 roubles respectively.

There would appear to be a great opening for some enterprising firm to open a canned or frozen meat depôt either at Kiakhta or Kalgan.

Urga is of the greatest importance for central and northern Mongolia from a commercial point of view. Uliassutai and Kobdo buy and sell through this town. The principal goods imported until last year were piece silk, nankeens, black tea, as much as four to five million taels worth of Chinese drills being sold in a year. America and Japan held the foreign trade in piece goods, while Germany held the silk market. British-American Tobacco Co. cigarettes were sold as far north as Kiakhta, being carried in bulk from Kalgan by wholesale men.



MONGOLIA.—Russian Consulate-General at Urga.

The Russian could not compete with the Chinese in the import trade, perhaps his idea of profit being too extravagant.

The Mongol produces nothing but his own furs and saddles, but in addition to hides, furs and camel hair, exports some salt, soda, and gold, as well as wood. The Chinese bring their exports out by camel caravans via Kalgan, whilst the Russians export through the north. The Russian merchants at Kiakhta and Yerkne Udinsk expect great developments in trade when the proposed line is built and opened to connect with Urga. Especially do they hope for a revival of the tea trade.

Mineral Wealth

The mineral wealth of Mongolia is at present practically undeveloped, but from a geological examination, and from reports from prospectors during the last few years, it is of great value, especially in the north. In addition to salt, coal and marble (a small quartz or crystal used for the manufacture of spectacles is quarried at 5 marches from Kalgan) the chief development is being carried out by the Societé Mongolor. This private company was formed by a Mr. G. Victor van Grotte, of the Imperial Customs Service, to work a mining concession in Mongolia, and for many years proved a failure. Gold there was, and gold in workable quantities, American machinery was imported as well as American engineering. In 1910, the mine paid 150 per cent., and for 1912 a payment of 300 per cent. was hoped for. The Company is at present working seven mines, and employing upwards of 7,000 Chinese coolies—who work under the usual Chinese method—the company supplying all paraphernalia, and the gangs of coolies under the foreman selling all gold found at a fixed rate to the Company, *i.e.* Twenty Dollars ($20) an ounce. The Chinese authorities, until quite recently had at each mine a small guard and an official, who checked the tax payable by the Company on the amount of gold excavated, to the Chinese Government, and also represented the "law" for the settlement of Chinese coolies. The Company estimated to obtain 20 tons of gold, in 1911, and 30 tons of gold in 1912. New English and American machinery was recently imported, and Mr. Henson, a German, acted as Chief Engineer and right hand man to Mr. Victor van Grotte. They have also a new electric plant for assaying and refining the gold. It is said that the River Yere is full of gold, and already dredging operations have been commenced.

All the directing staff are now Russians, and they also employ a number of Russian prospectors, who are employed in prospecting in the valleys, etc. There is a considerable mortality amongst the Chinese coolies from a mysterious disease. They catch it from the water, and it affects their limbs, in most cases proving fatal.

In addition to gold, there are to be found lead, silver, iron, and zinc, but as yet no attempt has been made to mine these other minerals.

Population

The population of Mongolia is scanty. It is especially centred in the North, the South, and the South East. The Central region, and that of the South are almost uninhabited. According to "Richard's Geography of the Chinese Empire," Mongolia is peopled by three principal races: the Mongols, the Turkis, and the Chinese. The Turkis occupy the West, the Chinese are confined chiefly to the South, where they are engaged in opening up the country, while the Mongols inhabit the remaining parts of the country.

The Mongols are divided into numerous tribes. The principal are: in the North, the Kalkhas (the Great Conqueror, Genghis-khan 1164-1227, belonged to this group); in the West, the Kalmucks (divided into Buriats, Turguts and Eleuths), the majority of whom have crossed over to Tibet, Sungaria and Siberia; in the East, the Chakhars. The name Tartar sometimes given to the Mongols applies only to the Northern Group, but even this must be taken with restriction, the proper appellation being *Tatars*.

The Mongols are a well-built and sturdy race. They are often of great width across the shoulders. The chest is, generally speaking, arched; the neck thick-set; the face large and flat; the cheek-bones prominent; the eye-lids less oblique than those of the Chinese; the nose broad and flat; the beard black, short and scanty; the voice deep and sonorous; the feature tanned by the smoke of the "yourt" or tent, and exposure to the sun's rays, while the hands and feet are relatively small. Men and women are full of vigour and strength. Their character is frank and open, though rather rude. They are warm-hearted and hospitable, but improvident, lazy, filthy and much addicted to drunkenness. They are jovial, and fond of physical exercise and athletic sports. They are splendid horsemen, and as many as 4,000 may be seen at times contesting for the prize of daring and speed. On foot, they are awkward, and walk heavily. Accustomed to live either in the "yourt" (tent) or in the open air they have become inured to privations of all kinds.

The majority of the men embrace a life of celibacy, in the Lhama monasteries, and thus thin the population, which is fast ·ncing towards extinction.

Kirghis, who inhabit the West, are ·ish origin. Their cheek-bones are · those of the Mongols, but in a lesser degree: their limbs are strong and well-shaped, their eye is quick, but the nose is convex, the beard black and fairly abundant, while their bearing is proud and haughty. Their reputation of highwaymen is well-deserved. They are, however, hospitable and open-hearted, and like the Mongols, pass the greater part of their life on horse-back.

Religion

Nearly all the Mongols are Buddhists. Indian Buddhism, however, after passing to Tibet, was transformed into Lhamaism. Lhamas are Buddhist monks who observe the forms of Tibetan Buddhism, and lead generally a conventual life.

The principal sects are distinguished, from the colour of their dress and their head-covering: the red Lhamas and the yellow Lhamas (Red Caps and Yellow Caps). The latter predominate in Mongolia. Of the three High Dignitaries of Lhamaism, or Living Buddhas, two reside in Tibet, and one at Urga in Mongolia. This latter bears the name of Hutukht'u (a Mongolian word meaning one who returns again, or an Avatar). He holds authority over 25,000 Lhamas, and maintains 150,000 slaves, who tend his flocks. Previous to 1664, he resided at Kweihwacheng in Shansi Province. Nearly all Lhama Monastheries have now their Avatars or Living Buddhas. These Lhamaseries are very numerous, and sometimes contain as many as 20,000 Lhamas or more. According to recent statistics, the Lhamas form five-eigths of the male population of Mongolia. They wield great power and enjoy wealth, owing to the numerous donations which they receive.

The Lhama form of Buddhism is much adulterated in Mongolia with Shamanism and Idolatry.

The Urga Agreement

The following were the terms of the Urga Agreement, ratified on November 3, 1912:—

Whereas His Majesty, The Emperor of all the Russias and the Hutukht'u Je-tsun-Dampa, Sovereign of Mongolia, desiring to come to an understanding and in order to cement the relations of friendship between the two countries, have named their plenipotentiaries to to make an agreement relating to different matters.

The following named plenipotentiaries furnished with full powers, Ivan Korostovetz, Actual Privy Councillor and Envoy Extraordinary; Saimnaim Khan (of) Nansurum, the patron of 100,000 Truths, Prime Minister; Erdeni-deitzin Khan (of) Dergi, Minister of Foreign Affairs; Tuchetuzui, Duke of Chakdorgab, Minister of Finance; Endenidaluizin, Duke of Gombosum, Minister of War; Endemizum, Duke of Nomsarai, Minister of Justice, have agreed on the following stipulations:—

1. The Imperial Russian Government will give its aid to Mongolia in order that Mongolia may maintain its autonomy and preserve its settled organizations and also the right of having its national troops and of refusing to allow either Chinese troops or Chinese colonization in its territory.
2. The Sovereign of Mongolia and the Mongolian Government will permit to Russian subjects and to Russian trade the same privileges and rights as formerly enjoyed. These privileges and rights are set forth at length in the Protocol below. It is further understood that other nations cannot enjoy any more rights in Mongolia than those given to Russia.
3. If the Mongolian Government finds it necessary to enter into any separate treaty with China or any other foreign Power, it is understood that this Treaty may not be infringed on or altered in any way without first obtaining the consent of the Imperial Russian Government.
4. The present Treaty of friendship is to come into force from the date of signature.

The Urga Protocol

The Urga Protocol was also signed on November 3, 1912. Its terms are as follow:—

Article 1.—Russian subjects shall, as in the past, have the right freely to live in, and to travel in all parts of Mongolia, to conduct business, establish factories, and to arrange affairs with all individuals or companies, official or private, whether of Russian, Mongol, Chinese or any other nationality.

Article 2.—Russian subjects shall, as in the past, have the right to import and export at all times all products and manufactures of Russia, Mongolia, China or other countries duty free and to conduct free trade, exempt from all duties and taxes. But any combination of Russians and Chinese or Russians declaring falsely the origin of goods shall not be entitled to these privileges.

Article 3.—Russian banks shall have the right to establish branch banks throughout Mongolia to conduct banking business with all individuals and companies.

Article 4.—Trade can be conducted by means of ready money or credit, but in the case of credit transactions the Mongol princes or the Treasury cannot be held responsible for the credit of private individuals.

Article 5.—No monopoly can be established either in connection with commerce of manufactures. The Mongolian authorities shall not prevent Mongols or Chinese from doing business with Russian subjects nor prevent their employment in Russian commercial and industrial enterprises.

Article 6.—Russian subjects shall have the right to lease or buy land in all towns and cities throughout Mongolia, to establish commercial enterprises and manufactures, to build houses, stores and godowns, and to lease vacant land for agricultural purposes. Pasture lands and places set apart for religious purposes are not included. These lands shall be leased to Russians according to Mongol existing regulations.

Article 7.—Russian subjects are free to arrange with the Mongolian Government for concessions regarding mining, forestry, fishing and other business enterprises.

Article 8.—The Russian Government shall have *the right to establish consulates in Mongolia wherever they are deemed necessary* after consultation with the Mongolian Government. The latter shall have a corresponding right to appoint Mongolian representatives to places along the Russian frontier.

Article 9.—Wherever Russian consulates are established or Russian business is conducted, Russian trade settlement can be established which will be under the administration of the Russian consuls, or where there are no consuls, under the administration of the senior Russian merchant.

Article 10.—Russian post offices can be established throughout Mongolia with postal services to the Russian frontier, at the cost of the Russian Government.

Article 11.—Russian consuls shall have the right to use Mongolian post stations without charge, provided the number of horses furnished by the Mongols does not exceed one hundred monthly nor the number of camels thirty monthly. Private Russians can use on payment.

Article 12.—All *Mongolian rivers flowing into Russian territory*, and branches thereof, *are open to navigation by Russian subjects with Russian vessels. The Russian Government will assist the Mongolian Government in the conservation of these rivers* and with the improvement for navigation by buoying and lighting, and Russian subjects shall, in accordance with Article 6, be granted areas on the river frontages as stopping places for Russian vessels and can there build wharves and godowns.

Article 13.—Russian subjects desiring to transport goods and live stock shall have the right to use the rivers and roads in Mongolia and with their own money can build bridges and establish ferries and collect fees from people using those bridges and ferries.

Article 14.—Grazing lands in Mongolia shall be reserved for the use of flocks travelling when belonging to Russian subjects. Such lands can be used for three months without payment, after which charges can be made.

Article 15.—All rights and privileges enjoyed hitherto by Russian subjects along the frontier for hunting, fishing and grasscutting in Mongolia are confirmed.

Article 16.—Russian subjects can conduct business with Mongols and Chinese either verbally or in writing. The contracting parties can send these documents to the local authorities for approval. If the local authority on scrutinising these documents think that there are some obstacles, they should notify the Russian consuls at once and consult them so as to remove misunderstauding. It is specially provided that business regarding immovable property shall be done by written agreement, such agreement to be submitted to the Mongolian officials and the Russian consul for approval. The agreement with regard to national resources must be submitted to the Mongolian Government for approval. In case of dispute either in regard to agreements contracted verbally or by written documents, both parties may choose someone to act as arbitrator. If the dispute cannot be settled peaceably it should be sent to a Mixed Court. The Mixed Courts shall be of two kinds—permanent and provisional. The permanent Mixed Court shall be established in places where there are Russian consulates, to be organised by the Russian consuls or their representatives and the Mongolian officials or representatives of equal rank. The provisional Mixed Court shall be established in places where there are no Russian consulates, temporarily and as deemed necessary by representatives of Russian consuls or by representatives of Mongolian Princes in whose territory defendants reside. The Mixed Court can summon Mongolians, Chinese and Russians to be jurymen. When the case is settled the Russian consuls should execute it at once in regard to Russians and Mongolian Princes in regard to Chinese and Mongolians under their jurisdiction.

Article 17.—The Protocol takes effect from the date of signature.

The Protocol is written in Russian, and it and a Mongolian duplicate were signed, sealed and exchanged at Urga on the twenty-fourth day of the last month of the Autumn of the second year of the Mongolian Sovereign, being November 3rd, 1912, new style (old style October 21st).

[NOTE.—Our Peking correspondent telegraphed on May 31 as follows:—

Yesterday the Government submitted to the Lower House the proposed Agreement with Russia re Mongolia. It embodies the Urga Protocol, but stipulates that Russia recognises Mongolia as an integral part of China, and Russia undertakes to respect China's rights of every description.

China undertakes not to change the system of local self-government which has hitherto existed in Outer Mongolia, and agrees that the Mongols alone may organise troops and police. China grants the right to oppose colonization by others than Mongols.

Russia undertakes not to despatch troops to Outer Mongolia except Consular guards; not to colonise, and not to appoint any other kind of officials, except those allowed for the Consulates by treaty.

China will accept such principles of procedure as Russia, as mediator, may lay down in accordance with the above.

Chinese officials will be regarded as having the character of local officials in any part of China.

Russia undertakes to effect no agreement with Outer Mongolia unless with the consent of China.

The House threatens not to sanction the Agreement, but this solution is highly favourable to China.]

A NON-PARTISAN COMMENTARY ON THE URGA PROTOCOL.

By Lieut. G. C. Binsteed.

(The Essex Regiment.)

Almost every one of the 17 articles of the Urga Protocol deals with matters which affect trade and industry, and it is therefore impossible to appreciate the significance of the Protocol without a knowledge of the history of Russo-Mongolian trade in late years. There have been recently published the reports of the two Russian expeditions to Mongolia in 1910 which were chiefly concerned in studying the general trade conditions of that country and in particular the cause of the recent marked falling off of Russian exports into Mongolia. We will start our commentary by a review of trade conditions in Mongolia such as they existed prior to the recent political changes.

The available trade statistics are very meagre. Even along the Russian frontier there are only four Russian Customs Stations, of which two are in the extreme southwest corner of Mongolia near Hsinchiang. Consequently the figures given refer only to the trade through these points, but they may nevertheless fairly be taken as representative of the whole.

Russian trade in Mongolia is confined almost exclusively to the north-west mountainous area, that is roughly all that lies north and west of the line River Onon-Urga—the headwaters of the River Urungu (south of Mongolian Altai). Chinese traders were on the other hand to be found in every part of Mongolia, at every Prince's encampment and close to every lhamasery.

There are no traders of any other nationality except Russian and Chinese, as Mongolia is closed to all foreign trade except Russian.[1]

Even where Russian trade existed, Chinese trade far exceeded it in volume. Below are given the number of firms of each nationality at a few important points:

Urga	100	Chinese	10	Russian
Uliassutai	85	,,	5	,,
Kobdo	65	,,	7	,,
Han-ta-Ch'in Wang'sHuré'	30	,,	3	,,
Tzain-Shabi	12	,,	4	,,

The above figures refer to 1910 and are quoted from the Moscow Expedition's Report.

In the Report on the expedition of the two Tomsk professors M. I. Begolyepoff and M. N. Soboleff, a list is given of the Russian firms and traders in Mongolia. They amount to a total of 145 and they carry on business at 244 places.

The points at which the flow of Russo-Mongolia trade crosses the frontier are:—

(1) Bakhti, which connects Chuguchak and the Tarbagatai district, on the one hand, with Sergiopol.

(2) Zaisansk connecting the newly formed (1907) Chinese administrative district of Altai with the towns on the Russian Irtish.

(3) Kosh Agach, through which passes the trade from Kobdo, Uliassutai and Ulankom with Biisk.

(4) The River Yenisei and the road from the Russian village of Usinskoye across the Sayansk Mountains to the valley of the Beikem. These two ways connect the Urianhai lands with Minusinsk.

(5) The Tunka road connecting the Kosogol basin and Darknat country with Lake Baikal and Irkutsk.

(6) Kiakhta connecting Yerkne Udinsk on the Trans-Siberian line with Urga.

The points at which Russian Customs posts exist are:—Bakhti, Zaisansk, Kosh Agach and Kiakhta.

Let us examine some figures for the last four places mentioned in recent years:—

Russian Exports into Mongolia.

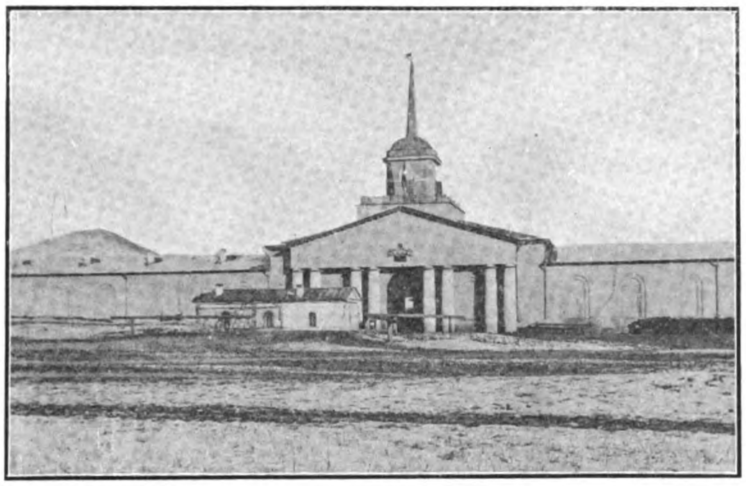
(The figures represent thousands of Roubles or roughly hundreds of pounds sterling)

Year	Bakhti	Zaisansk	Kosh Agach	Kiakhta	Total for four Customs Posts.
1899	1316	458	369	976	3,117
1901	1431	332	414	212	2,388
1903	2483	561	496	768	4,309
1904	(Russo-Japanese War)				
	1784	511	294	677	3,266
1906	1741	688	550	1592	4,571
1907	2424	776	563	747	4,509
1908	1995	801	364	556	3,715
1909	1347	791	294	189	2,621

It will be noticed that while the figures for the two extreme southwest posts roughly remain the same, those for Kosh Agach and Kiakhta exhibit a great decrease.

The chief article of Russian export into Mongolia is cotton manufactured goods.

[1] Since writing the above, a new factor has been introduced into the situation by the declaration of a German Minister in the Reichstag that Germany desired the opening of Mongolia trade to the merchants of all nations on an equal footing.



MONGOLIA.—The Customs Station at Kiakhta
Photo by Lieut. Binsteed

In 1903, 69,500 poods were imported through the 4 Customs posts.

In 1909 only 27,500 poods were imported through the same 4 customs posts.

Next come metal goods:—

In 1904 (highest figures ever reached) 23,000 poods.

In 1909, 12,300 poods.

Again, of dressed skins, in 1906, 35,300 poods were brought into Mongolia, while in 1909, only 3,500 poods. Moreover for Kiakhta only, the figures for these dressed skins were:—

In 1906 30,000 poods.
In 1909 280 „

On the other hand, the export of sugar and sugar confections is increasing.

Average for years

1899-1901 5,000 poods.
1908 33,500 „
1909 23,500 „

This sugar is chiefly sent to Chugu-chaks and Urga.

RUSSIAN IMPORTS FROM MONGOLIA.

To arrive at the import of purely Mongol commodities, it is necessary first to exclude from the Customs house figures those goods of Chinese origin and to count only Mongol raw and half-worked materials.

(The figures represent thousands of Roubles or roughly hundreds of pounds sterling).

Year	Bakhti	Zaisansk	Kosh Agach	Kiakhta	Total
1904	2090	413	1334	312	4151
1907	1978	772	1571	821	5143
1909	2484	665	1502	3484	8097

To take some commodities separately:—

Undressed Skins.

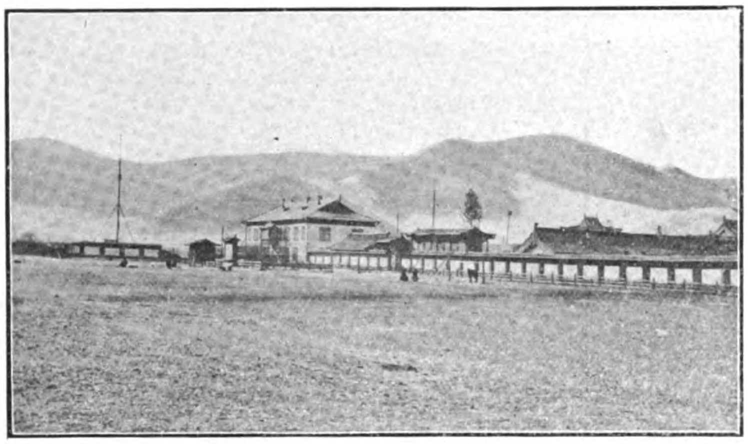
	Through Kiakhta	Total for 4 Customs post
1906	747	22,600 Poods
1908	5,268	27,846 „
1909	16,931	45,566 „

Note that the export of dressed skins via Kiakhta has enormously decreased and import of raw hides enormously increased. In general the trade through Kiakhta into Mongolia has lessened whilst that into Siberia at this point has grown.

At the three points of passage on the frontier which connect with the Urianhai basin and through it with Ulankom, Uliassutai and the upper Selenga basin, there are no Customs houses and no exact statistics compiled. But the following figures are given in the Report on the Moscow Expedition as being the most authentic estimates available:

EXPORT INTO URIANHAI

Prior to 1907, yearly average, 150,000 Roubles' worth of goods,



MONGOLIA.—Residence of the Hutukht'u at Urga. He lives in the Russian style house
Photo by Lieut. Binsteed

In 1909 448,000 Roubles.

IMPORT FROM URIANHAI.

Before 1906, between 140,000 and 175,000 Roubles yearly.

In 1909 about 613,000 Roubles.

IMPORT OF CATTLE FROM URIANHAI.

Heads of Cattle.

	1905	1907	1909
Large Horned	3713	5022	7420
Small Horned	764	1907	4709
Horses	244	138	200

Thus it will be seen that on the whole, the export of Russian manufactured goods into Mongolia has greatly fallen, while the import into Siberia of Mongolian raw materials and livestock has increased. But the favourable aspect of the latter fact is diminished because, in late years, the Russian traders have been largely forced to buy Mongolian produce not direct from Mongols, but from the Chinese who buy cheap from the Mongols and resell dear to the Russians. Again it is to be noted that most of the wool imported into Siberia, only passes through that country on the way to America and England, whilst the skins mostly go to Germany.

Russia exports into Mongolia chiefly the following: manufactured goods for clothing purposes, manufactured metal goods, enamel and hardware, groceries and haberdashery, dressed leather, iron, tobacco, Russian wines and Russian paper money.

In exchange for the above, she imports into Siberia horses, cattle and sheep, and all their products such as wool, skins, hair, fat, camels' hair and furs of many kinds, chiefly marmot and sable.

Before passing to the direct causes of the failure of Russian trade, it is necessary to draw attention to two peculiar features of trade in Mongolia, both of which appear to be unavoidable at any rate for many years to come, and both of which have been turned to advantage by the Chinese to the detriment of Russians. These features are: firstly, the almost universal application of barter and the absence of a coinage, and secondly the necessity for transacting business on a system of long credit. The second feature is partly caused by the first.

In Mongolia, there are very few coins, though of late years, some Chinese and Russian coins and Chinese sycee are in use in the larger centres Russian and Chinese notes are also in use, but trade is still chiefly carried on by the exchange of manufactured goods for raw produce. But since the Mongol is in need of the manufactured goods at all times of the year whereas his raw produce is only fit for transfer to other hands at certain definite seasons, it is necessary for the trader to give the Mongol his require-

MONGOLIA.—A Mongol's house
Photo by Lieut. Binsteed

ments on credit. The Mongol can only pay in wool at the shearing season at the end of June; no trader will accept Mongol livestock in payment until well on in the summer when it has recovered from its bad condition after the long winter scarcity of food. (As a rule, the Mongol makes no provision for the winter by storing hay). Again the wild animals cannot be hunted till the fur is at its best in August and September.

The result of the above is that the small trader must be able to command credit. The trader who has not a large capital, has to buy goods on credit, sell them to the Mongols on credit, waiting till the period when the particular form of raw produce he is to receive in payment is ready for acceptance. Having recovered his debt in raw material, he either himself pays for his original purchase with this raw material or sells the latter and repays his debt in coin. He then recommences the operation, taking another consignment of goods, again on credit.

In this respect the Chinese has hitherto had an enormous advantage over the Russian. The Chinese firms are bonded together in guilds, which not only mutually agree as to prices and thereby avoid suicidal competition, but also enable the small trader to obtain credit at about 8% to 12% per annum. Moreover, there also existed the Ta Ch'ing Bank. The Russians on the other hand have no common commercial organization and no bank since the closing of the Russo-Asiatic Bank branches in Urga and Uliassutai a few years ago. The larger wholesale firms let the small traders have goods on credit at exorbitant rates of interest, with the result that the retailer finds it impossible to compete with the Chinese. As the small Russian trader is in these circumstances not above resorting to give short measure and short weight, he soon obtains a bad trading reputation, loses the support of his own Consuls and throws doubt on the honesty of all other Russian traders. But the fault is not only his, but as much that of the wholesale houses who supply him from Biisk and other Siberian towns. The above details are from the Reports of those very Russian expeditions whose only object has been to succour the affairs of the traders whose methods they are, however, forced to condemn. It is obvious also from recent Russian literature that there is little sympathy between Russian traders and Consuls. The former accuse the latter of unapproachableness and lack of support to Russian trade while it is to be inferred that the latter together, with all the serious and better class Russians, would agree that the ill success of Russian trade is largely due to the fact that the Russian trader, no less than the Chinese, has in the past tried mercilessly to exploit the stupidity of the Mongol. To quote only two of the many Russian testimonials to the above fact, I translate the following from Kaznakoff's account of his journey in 1899 from Ulan Daba to Kobdo. Speaking the area south-east of Ulan Daba, he says:—

"The Russian merchants have split up the trading area into sections amongst themselves......and having agreed mutually as to prices, carry on very successful business, setting impossibly high prices on their goods......The Mongols themselves realize they are being robbed, but they have nowhere else to obtain the goods from except from the Russian merchants."

Also Svechnikoff, speaking of the earlier days of Russian trade when it was in a better position, says:

"Sometimes the Mongols would borrow from Russians....some (Russians) took as much as 4% per month (48% per annum). In the event of the Mongol not paying in time....some times, especially in the good old days, the creditor took everything which he possibly could from the Mongol. This was called 'making a seizure.'"

MONGOLIA.—Solid blocks of milk on sale at Kiakhta
Photo by Lieut. Binsteed

On the other hand, there is little doubt that the exploitation of the Mongol by the Chinese is just as merciless, far more universal, more successful and has apparently awakened in the Mongol far more hatred than that by the Russian.

Other causes of Russian failure are the great profits which every Russian trader wishes to make on the sale of every article, the substitution of late years of inferior goods in the place of good quality goods formerly sold, and the failure of the Moscow manufacturers to study the taste of the Mongols as to the patterns and colours of their garments.

But perhaps the greatest disadvantage under which the Russian has hitherto laboured is in regard to the collection of debts. The poverty of the Mongol makes it very hard to collect debts from him. The Chinese officials everywhere assisted their nationals in this operation, but would give no real help in the case of money owed to Russians and at last publicly announced that they would not consider in future any complaints by Russians on this score; there were also instances when the Mongols were forbidden to borrow money from Russians. The Russian Consuls were few and far between. Moreover, the vast mass of the trade transactions in Mongolia take place on the pasturages and nomad haunts far away from the few towns where consulates exist and to which the Consuls are chained by their routine duties.

The great centres of population, Kalgan, Kueihua-ch'eng (Kukuhoto), Urga, Uliassutai and Kobdo are only storehouses and distributing centres, from which the goods are taken by hawkers and agents to the scattered collections of yourts, encampments of Jassaks and lhamaseries.

Lastly the natural aptitude of the Chinese for minor trade and the limited range of their material wants have helped them to oust their Russian rivals.

It would seem that the construction of the Trans-Siberian Railway should have given a great advantage to Russian trade, but, on the contrary, many affirm that the effect was to transfer the attention of the Siberians to Manchuria and the Pacific coast. Moreover it must be remembered that whereas the country from Kalgan and Kukuhoto (the Chinese bases) northwards into Mongolia is passable with camels practically anywhere, especially in winter, when ice can be carried: the routes from the trans-Siberian Railway Stations southward to Kobdo, Urianhai and Urga lie through mountainous country which limits the number and usefulness of these routes. Russia has still such a stupendous task in the development of her Empire compared to the financial means at her disposal, that she has had to put off many desirable projects for the improvement of roads and waterways leading into Mongolia.

With the above introduction, let us examine some of the articles of the Protocol in detail.

ARTICLES 1 and 2.— By Article 12 of the Treaty of St. Petersburg of 1881, "Russian subjects are given the right, as formerly, to carry on free trade in Chinese-governed Mongolia, both in the places and *aimaks* in which Chinese administration exists, and in those where such does not exist."

Like the 1881 Treaty, the present Protocol extends its provisions to "all parts of Mongolia." It is this claim of the Urga Government to speak in the name of all Mongolia which promises interesting developments in the future process whereby the present chaos in the Government of Mongolia will resolve itself into something definite.

[1] Since writing the above, it has become fairly evident that Silingol League has already passed into the area controlled by the Urga Government. On April 4 a Chinese force was defeated near the Southern, eastern corner of this league close to Chihli province.

[2] Since writing the above, a Harbin telegram has stated that the Alashan Mongols have thrown in their lot with Urga.

Chinese colonization in the Cherim, Chosotu and Chouuda leagues and the Kukühoto and Ch'ahar lands of Inner Mongolia has progressed too far and Chinese provincial methods of administration have been instituted too long for it to be easy to believe that the Urga Government could get control of all "Mongolia" or even that it seriously contemplates the attempt. However, the past history of the *aimaks* of Silingol League, some of whom on more than one occasion have passed from Inner Mongolia into Khalkha, makes it quite likely that with a little encouragement they would again throw in their lot with Khalkha.[1] Kobdo is also an area which will almost certainly belong to non-Chinese Mongolia. The historical enmity between the Khalkhas and the Western Mongols or Eleuths might, however, prevent the latter, joining Khalkha. The Peking representative in Altai, Prince Palta, himself an Eleuth of the Torgut tribe, a Russophobe the Japanophile, will probably use all his natural ability to keep the Eleuth elements in Western Mongolia from joining the Urga Hutukht'u. In the Altai, moreover, there is the non-Mongol element of the Khirghiz, who, however, are of the same race as the Russian Khirghiz and have always hitherto adopted a very independent attitude towards the Chinese. The Urianhai district or Soyotia will probably be recognized as belonging rightfully to Russia by the Burinsk Treaty of 1727. The fate of the two western leagues of Inner Mongols, the Ulanch'ap and Ordos together with that of the Alashan and Etsingol Mongols is particularly interesting when considered in relation to the rumoured Tibeto-Mongolian Alliance. Should the Peking Government retain control of these areas, Tibeto-Mongolian relations would be somewhat handicapped by the interposition of Chinese territory. If, however, the above areas joined the Urga Government or even if Alashan alone did so, the Kukunor Mongols and Tanguts would probably also secede from China, in which case only a very narrow strip of Kansu would remain between the the Tibetan and Mongolian states.[2]

There is little doubt that the Urga Government wishes to gain over all Mongolia, while it is not in the interests of Russia to allow the rashness of the Mongols to create complications to the south of the line formed by the Mongolian Altai Range and the southern border of Khalkha.

ARTICLE 3.—The past history of Russian banking enterprise in Mongolia has been a failure. The closing of the branches of the Russo-Asiatic Bank in Urga and Uliassutai is ascribed to the fact that these branches did not pay, and the chief reasons given for the latter is the failure of the bank to accommodate itself to the peculiar features of Mongol customs. All Chinese creditors and Russian traders make loans to the Mongol Princes and their hoshuns in silver or goods, but exact repayment in raw produce. If there is trouble as to collection of the debt, the creditor armed with a consular or Chinese official authority proceeds to the hoshun and takes by persuasion or even by force all he requires. The Russian bank also used to lend in silver, and of course this silver soon passed from out of the hoshuns into other hands. The Bank, unlike other creditors, required repayment also in silver, which was not forthcoming, and endless troubles were caused in making the hoshuns themselves turn their raw produce into silver for repayment to the Bank. Moreover, ignorance of the Mongol language, in which all business agreements were drawn up, all helped towards the Bank's failure. There is only one Russian school for the Mongol language in Mongolia, namely, in Urga at the consulate, and its methods are described by Russian writers as leaving much to be desired.[1]

Both the larger and the smaller Russian traders stand in great need of Russian banks, the larger, because at present they have no institution whatever in Mongolia which will advance or transfer to them money sufficient for their needs. They are forced to bring very large sums at a time from banks in Siberia, which sums therefore remain quite unproductive till slowly expended. The smaller traders, though they can borrow from the larger, have at present to pay exorbitant rates of interest to the latter.

It is believed that M. Muskuitin, a former member of the Russo-Asiatic Branch Bank at Urga, is now in Russia trying to arrange for the establishment of a new Russian bank in Urga.

ARTICLE 5.—It has been the constant complaint of Russian traders in late years that the Chinese authorities and pro-Chinese princes did everything to prevent business relations between Russians and Mongols. The reason given by the Chinese was that endless disputes arose as the result of such business relations.

ARTICLE 6.—Strange as it may seem, Russians in Mongolia have hitherto had the right to build houses, etc., only in places where there have been Russian consulates. Thus during the period when the Russian Government was trying to wring from the evasive Manchu Government its formal consent to the establishment of a consulate in Uliassutai, the Russian Consul designate proceeded to his post, but, pending the conclusion of the negotiations, was prevented by the local Chinese authorities from building and therefore had to live for considerably over a year in a yourt, his consular office being installed in another. Any European who has spent even one night in a yourt will realise the enormity of this situation. In like manner Russians have not had the right to own or lease land. That the above privilege should be exacted from China upon the revision of the 1881 Treaty has been constantly advocated by the Russian writers and travellers, as indeed have most of the new rights and privileges acquired by Russians under the new Protocol.

That Russians will in any numbers lease land for agricultural purposes is hardly to be expected. The example of Siberia proves that unassisted by the Government, the Russian peasant will not migrate, unless conditions are particularly attractive. On the other hand, the Government has its hands quite full enough in trying to fill Siberia with a Russian population without extending its labours to Mongolia. The real value of Outer Mongolia to Russia at the present moment would seem to be two-fold. One is a negative value; Outer Mongolia must not be Chineseified. The other is a potential value. Kept free from a Chinese population and Chinese troops, it forms a reserve where Russian enterprise shall find room for its development in the future when Siberia can be left to look after itself. Meanwhile Russian trade in Mongolia must be fostered, and Russian influence must remain paramount in the councils of the Urga Government, but the less Russia is saddled with cares as to the administration of Mongolia the better.

ARTICLE 7.—As regards mining, so far the only large mines worked have been the Iro Gold mines on the tributaries of the Iro River between Kiakhta and Urga, belonging to Von Grotte's Mongolor Company. But it seems probable that during 1912 many other concessions have been obtained by Russians. The Urianhai area is believed to contain much gold, and there are one or two streams there in which gold is actually obtained, such as the Tapsa.

The cutting of wood was not allowed by right to Russians, but in many frontier localities, notably South of Kiakhta, Russian subjects have been in the habit of crossing the frontier, cutting and taking back wood free of charge.

Similarly also Russians used to make fishing excursions into Mongolia without asking or obtaining leave. Pozdneyeff in "Mongolia and the Mongols" tells of a party who in 1893 spent a month fishing at the mouth of the Hara Gol, 134 miles as the crow flies from the frontier at Kiakhta, and caught 150 poods or 5,400 lbs. of fish without any payment.

It is these customary rights and privileges which are referred to in Article 15 of the Protocol. Such rights were also enjoyed by Russian subjects along the frontier of Barga or Kulunber, in what was formerly Manchuria. As Barga has now joined the Urga Government, the Protocol presumably refers also to it. In any case in point of fact, since the Barguts turned all Chinese

[1] From later information it has been learnt that the Russians about a year ago established a new school in Urga for sons of Mongols with a Buriat headmaster who was educated at St. Petersburg and trained Mongol assistants. The Russian Government subsidizes the school, and both Russian and Mongol are taught.

officials out of their land, they have restored to the Russian subjects across the border all such grasscutting and pasturing privileges.

Article 8.—In 1911 the Russian Consulates in Mongolia were three in number—a Consulate General in Urga and Consulates in Uliassutai and Kobdo. The latter cares for the interests of those in Shara Sumé, but owing to the impassibility during a great part of the year of the road between Shara Sumé (Tult'a) and Kobdo over the Mongolian Altai, the latter town is practically cut off from its consulate. It is to be supposed that a consulate or agency will soon be founded in Shara Sumé. Other measures advocated are periodical journeys by the Consuls or deputed Consular subordinates through the country within their jurisdiction for acquaintance with the needs and affairs of Russian traders who by reason of the immense distances cannot afford to appear at the Consular headquarters; again, that the Consuls should be freed from subordination to the Legation in Peking, which entails long delays in the settling of the more important questions. The Consul-General, it is advocated, should be authorised to himself settle many such questions. It would, however, seem that until quicker means of communication are made between Kobdo and Urga, a great deal of time would still be wasted in references to Urga. The establishment of a Russian postal service by Article Ten will however be a great step in advance. The appointing of Mongolian representatives to places close to and within the Russian frontier would seem to be stipulated chiefly for appearances' sake, as there are few Mongol subjects who penetrate any distance into Siberia.

Article 9.—The establishment of Russian trade settlements with a Russian administration will probably have the beneficial effect of bringing home to the traders their common interests, and the uselessness of pursuing their former policy of suicidal competition with each other and lack of mutual sympathy and help.

Article 11.—Article 11 only confirms what has already been the privilege of Russian officials and privileged persons travelling in Mongolia. The Postal corvée is one of those public services laid upon the Hoshun Mongol which make such a large drain on his resources.

Article 12.—The Chief Mongolian Rivers flowing into Russian territory are three: the Selenga, the Yenisei, and the Irtish. The Kerulen after traversing Barga, forms under the name of the Argun the Russo-Bargut boundary, but in Mongolia it is, as far as is known, not navigable; nor is the Onon, which after a short course in Mongolia, joins the Shilka in Transbaikalia.

To take first the Yenisei. This river is navigable from the mouth of its tributary the Tochya, a distance of 420 versts or 280 miles above the Russian frontier. This, however, requires to be qualified by the fact that 80 versts or 54 miles below the Tochya are the Utinsk rapids which now necessitate re-shipment, but which it is hoped could be cleared. Again, 110 versts below the frontier are the Bolshoi or Great Rapids, a still more serious barrier, which probably could not be nullified by engineering. Exclusive of these two points, the Yenisei is navigable for 1,280 versts (or 910 miles) above Krasnoyarsk, where it intersects the Siberian Railway. The navigation season lasts from 60 to 180 days from the latter half of April to the latter half of October. In 1911-12 Russian engineers were engaged in making improvements in the course of the Yenisei above Krasnoyarsk. Steamers have long been plying up as far as Minusinsk.

This river and its tributaries are the chief arteries of life in the Urianhai country, which as before stated, it seems probable, will be actually included in Asiatic Russia; geographically it undoubtedly belongs to Siberia. The Sayansk range is not an unbroken watershed, and the real natural frontier lies along the Tannu Ola. Colonel Popoff in the course of his Mongolian travels entertained doubts as to whether the boundary as fixed by the Burinsk Treaty of 1727 really lay along the Sayansk mountains, as was then accepted. His further investigations on the ground along the Tannu Ola have satisfied at any rate himself that the frontier originally lay along the Tannu Ola and that only the absence of any real Russian supervision in this remote corner of the Empire allowed the Chinese local representatives silently to annex an area equal to 300,000 square versts. In any case, it is undoubtedly a fact that the Urianhai district has always been regarded both by the Mongols and Chinese as something apart from the rest of Mongolia, and the usual Mongol frontier posts were maintained not along the Sayansk, but along the Tannu Ola.

A most interesting description in English of this area is given by Mr. Douglas Carruthers in the Geographical Journal for June 1912.

To pass next to the Selenga. Steam navigation is already in operation up to Ust Kiakhta, the nearest point on the river to Kiakhta Troitzkosavsk. According to an Irkutsk paper a special reconnaissance of the navigability of the river within Mongolia has been carried out by a Russian engineer, but the results are not yet public. As the Selenga and its great tributary the Orkhon together with their many minor tributaries drain a very large area of Mongolia, it is upon this river that the institution of navigation would be most desirable of all from the Russian point of view.

As regards the Irtish, steamers have proceeded as far up as Lake Zaisan, and in 1896 investigations resulted in ascertaining that the river was navigable to the confluence of the Alkabek on the Russo-Mongolian frontier. It is not known for certain to what extent the river within Mongolia is navigable, but that it is navigable is evident from the fact that at a meeting of Russians at Semipalotinsk called by the Omsk Governor-General to consider questions in connection with the revision of the Treaty of 1881, it was decided that China ought to be urged to grant Russians the right to navigate the Irtish within Mongolia. Moreover, in 1911 a Russian boat ascended the river nearly to the confluence of the Kran, i.e. to a point N. of Lake Uliungur. It seems probable that the practical effect of Article 12 will be first and chiefly seen in the case of the Yenisei.

Article 13.—Hitherto in Mongolia the rivers have proved a very serious obstacle to communication. The rivers are as a rule subject to very sudden and great changes in depth and rate of current. A stream usually fordable may suddenly rise and delay a caravan for several days. The usual means for crossing unfordable rivers has hitherto been the roughly made Mongolian raft. The ferrymen exact what appear to be very high prices. Pozdneyeff quotes: the equivalent of 10 shillings for 100 sheep ferried, and 7½ d. to 1 shilling for a cart and horse across the Orkhon. The Moscow merchants' expedition paid 100. roubles or £1 for the ferrying of thirteeen camels with their loads, and six vehicles across the Tola. Apart from the high rates, which are a question of bargaining, and are probably lower for the Mongols than for Chinese or even Russians, the actual way in which the Mongols carry out the operation and the apparatus used seem to leave much to be desired. In 1893, according to Pozdneyeff, the Russians had a bridge across the Tola southeast of Urga, for the use of which they collected a small toll from all alike. The Hoshun administrations designate some of their people to carry out the service of ferrying, leaving it to the individuals to exact what charges they can as a means of livelihood.

Article 14.—This Article providing for grazing lands for Russian-owned livestock will be of use to two classes of persons. Firstly to livestock merchants driving stock purchased in Mongolia northwards for sale in Siberia and secondly to a smaller class of drovers who are in the habit of taking livestock from Western Siberia to Blagoveshchensk to supply the great demand for cattle in Priamuria. These drovers have been in the habit of passing via Mongolia as being the cheapest route. As a matter of fact, this article will only legally confirm a privilege always enjoyed by the Russians.

There is one point which is not mentioned in the Protocol and to which one would have expected some reference. Owing to diseases amongst livestock and infection in hides, etc., imported from Mongolia into Siberia, the Russian Government has found it necessary to institute very strict quarantine measures on

(*Continued on page 542*)

AMERICAN RECOGNITION OF CHINA

On May 2, 1913, the Republic of China received its first formal recognition from a first class Power, when Mr. E. T. Williams, American Chargé d'Affaires, presented President Yuan Shih-kai with a message of recognition from President Wilson. The above is a photograph taken at the President's Palace on the occasion by Camera Craft Co., Peking.

First Row—(reading from left to right): Mr. Sun Pao-chi (Master of Ceremonies), Major J. H. Russell (retiring Commandant of the American Legation Guard), President Yuan Shih-kai, Mr. E. T. Williams (American Chargé d'Affaires), Mr. Lu Tseng-tsiang (Minister of Foreign Affairs), Mr. W. R. Peck (Secretary and Translator American Legation).

Second Row—General Tuan Chih-kuei, General Yin Chang, Major Dion Williams (Commandant Legation Guard), Capt. G. T. Summerlin (Acting First-Secretary, American Legation), Major A. J. Bowley (American Military Attaché), Mr. J. K. Davis (Student Interpreter), Mr. E. Morgan (Secretary), Mr. C. D. Meinhardt (Student Interpreter).

Third Row—Mr. Liang Shih-yi (Chief Secretary of President Yuan Shih-kai), Dr. André Lee (American Legation Guard), Mr. W. J. Cannon (Secretary), Capt. T. J. Holcomb (American Legation Guard), General Tong Tsai-li, Mr. V. S. Wellington Koo (Secretary, Ministry of Foreign Affairs).

Back Row—Mr. G. F. Bickford (Student Interpreter), Mr. C. P. McKiernan (Student Interpreter), Capt. E. Bilger (American Legation Guard), Mr. Chen En-hou, Admiral Tsai Tin-kan, Admiral Ch'eng.

THE PHILIPPINES BUREAU OF SCIENCE

SURVEY OF A YEAR'S OPERATIONS.

The eleventh annual report of the Bureau of Science, Manila, submitted to the secretary of the Interior by Mr. Alvin J. Cox, covers the operations for the year ended August 1st, 1912.

The loss sustained by the Bureau in the death of Dr. Paul C. Freer is sympathetically noted, and a full tribute is paid to his magnificent work. "The Bureau of Science to-day stands as a monument to his ability," says the report.

The new wing of the laboratory building had been completed, and the division of mines, the sections of fisheries and ornithology, the entomological collections and laboratories, and the library were moved in.

The staff of the Biological Laboratory underwent changes during the year owing to the resignation of three of its members. Dr. Otto Schobl was appointed assistant in March, 1912, and was put in charge of the routine pathological and clinical examinations. As laboratory work was performed for the Philippine General Hospital, the Bilibid Hospital and at the quarantine station at Mariveles, branch laboratories were established at three places. Investigations were made in regard to plague, beriberi, entamoebic dysentery, surra, the diseases prevalent in the Batanes Islands, and rabies.

In the Botanical section of the Biological Laboratory, 13,396 specimens were received during the year. The total number of mounted specimens now in the herbarium is 106,576, of which about 66,500 are Philippine, and the remainder extra-Philippine. Investigations of an important nature were carried on.

The accessions to the collections of the entomological section numbered 14,407, an increase over the previous year of 5,750 specimens. Attention is called to the necessity for a thoroughly trained individual to give his entire time to silk culture and its propaganda in the Philippines.

Especial attention has been given by the section of fisheries to economic fishery work, and it has been shown that several small, but profitable, fishery industries could be inaugurated in the Philippines. More than 2,000 specimens were added to the fishery collection during the year.

The laboratory of general, inorganic and physical chemistry did a large amount of routine work for the different Government departments and the general public showed an increasing desire to consult the scientists on theoretical and practical matters pertaining to mining, commercial and industrial problems. Investigations covered a wide field and a somewhat complete study of Philippine soils was made. The investigators who had been studying the physical and chemical properties of Portland cement had continued their work with important results, and the work on the the manufacture of Portland cement from Philippine raw material was progressing satisfactorily.

During the year the laboratory of organic chemistry made an examination of 1,921 samples, chiefly in connection with the enforcement of the Pure Food Act. Investigations in regard to copra to ascertain the effect of geographical situation and climatic conditions were continued and an extended study of Philippine fruits was made. The study of sunlight and sunlight reactions have been continued with encouraging results.

The division of mines made during the year 216 assays for private parties, 20 free assays for prospectors in new districts and on official requests, and 327 assays on black sand research, besides 18 bullion assays and 141 placer weighings. Investigations were made in connection with the black sands of Paracale, Bulacan iron deposits, raw materials for cement, mineral deposits in Pangasinan, the Cansuran mineral district, and other districts.

The study of the Iloco people begun the previous year by the division of ethnology was continued, and is still in progress.

The number of volumes in the library increased during the year by 2,225.

The acting Director points out that it is three years since the Bureau had had an increase in the appropriation in spite of the fact that the demands upon it had increased in every direction. Owing to insufficient staff, and apparatus, in many instances the Bureau had been unable to assist local professional and business men. The growth in the requests for routine work, and for information and advice on scientific subjects had so much increased, that research work had been interfered with, and the Bureau had been handicapped in carrying on new lines of investigation as well as in completing those already begun. There was sore need of more employees and

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CHINA'S REORGANISATION LOAN

A Brief History of the Negotiations

Adequately to recount the origin, the progress and the vicissitudes of the famous Big Loan to China, the agreement for which was finally signed on April 26, 1913, would necessitate more space than we are able to devote to the subject. But the Loan has attracted so much notice in all parts of the world, and has occasioned so much controversy, that it would be impossible for the FAR EASTERN REVIEW, a journal so intimately associated with the material development of the Far East, to pass over the conclusion of the Loan with a mere formal announcement of the fact that it had at length reached the stage of finality. To aid in promoting the material development of the Far East, with which necessarily is associated moral and intellectual progress, is the *raison d'être* of this journal, and the final acceptance of the Loan, is a matter of such far-reaching importance that it is clearly imperative, even if no critical expression of opinion be given, that a brief survey should be made of the course of events since the Big Loan first became a matter for practical discussion.

The need of foreign financial assistance for China is no new development. Owing to the unscientific and wasteful methods of revenue collection which obtained under the Manchu *régime* the finances of the country drifted into a condition of chaos. Even had there been no Revolution the Manchu Government would have been compelled to float a large foreign loan to carry out the reforms and reorganization that had been promised. Some tentative steps in this direction had already been taken before the gathering of the wave of revolution which swept the Manchu dynasty from the Throne.

From the outbreak of the trouble until the Abdication both parties strained every endeavour to obtain foreign financial assistance. The loyalists under Yuan Shih-kai were on several occasions within a hair's-breadth of obtaining the funds which might have saved the dynasty, but the vigilance of the Revolutionary Junta at Shanghai defeated all these efforts. Similarly the Revolutionaries were hampered by the impossibility of raising loans, and, although they kept a stiff upper lip, they were really in financial straits as serious as those by which the North was encompassed. When the Abdication Edict was finally signed and President Sun Yat-sen resigned in favour of Yuan Shih-kai, the Government were absolutely without funds. Moreover, there was a large number of troops under arms whose pay was in arrear, much money had been borrowed from domestic sources, the taxation machinery was completely out of gear and the nation had been promised that under the new *régime* there would be reform, reorganization and progress. Furthermore China's foreign obligations had been steadily banking up during the period of disturbance, and although not immediately pressing wuld have to be met sooner or later. It was obvious to those at the head of affairs in China that the only way out was by the negotiation of a huge foreign loan.

This necessity was recognised by the foreign Powers most interested in China. They saw that it was essential in the interests of commerce that order should be restored as quickly as possible. This led to the combination known as the Four Power Group, consisting of financiers representing Great Britain, America, France and Germany, which came into existence in 1909 in connection with the Canton-Hankow Railway Agreement, opening up negotiations with Yuan Shih-kai's Government. An advance of Tls. 2,000,000 was handed to the Provisional Government in February, 1912, and a further Tls. 1,100,000 in March. On March 9 Yuan Shih-kai arranged with the Group for regular monthly payments to cover current needs and gave it a firm option upon the Reconstruction Loan of £60,000,000. On March 14 the Group learnt that Tang Shao-yi had negotiated with a Belgian Group an independent loan for £1,000,000, and this led to the first of a long series of disappointments and delays. The Group suspended further payments, but negotiations were still carried on. On June 19 Russia and Japan, upon the suggestion of Tang Shao-yi, entered the Consortium, which became known as the Six Power Group until the withdrawal of America on March 19, 1913. The Six Power Group insisted as conditions precedent to any large loan:

First, that the purposes for which the funds were required, should be stated by the Chinese and approved by the Group.

Second, that China should adopt a system of audit which would insure the effective expenditure of loan funds for purposes specified.

Third, that the salt taxes to be hypothecated for the service of the loan should be administered either by the existing Maritime Customs organization or by a separate service like the Customs under foreign direction, thus safeguarding the proper administration of the security despite the possible continuation or recurrence of unsettled conditions in China.

China would not agree to those terms, and an attempt was made to float an internal Patriotic Loan, but this failed.

The Group continued to make small monetary advances, but no progress was made towards a settlement of the deadlock. While negotiations with the Group

continued China was seeking for support elsewhere, and on August 30 the much discussed Crisp Loan Agreement was signed. It is, perhaps, unnecessary again to weigh the arguments *pro* and *con* in regard to the Crisp Loan. We went into the matter very exhaustively in October and we see no reason to modify in any way the opinions we then expressed. The Loan was floated in the face of the opposition of the British Foreign Office and only added one more to China's rapidly accumulating complications. As a financial experiment it was a failure from every point of view, except perhaps that of those whose interest was restricted to securing promoters' profits. And some of these people, euphemistically termed by Mr. Crisp "side-helpers," are believed to have found their visions of affluence fade as fades the mirage. It is interesting to recall that Mr. Hsiung Hsi-liang was Minister for Finance when this Loan, which was saddled upon the underwriters to the extent of forty per cent., was arranged. The price of the bonds to China was 89 and the Loan was nominally for £10,000,000. Only one-half was issued. It soon became apparent that the inspired reports that the loan would be a success were inaccurate, but even before this fact was established the Chinese Government had again approached the Group. It must be remembered that the Crisp Loan negotiations had been conducted secretly, but the fact that the Loan had been signed became known early in September.

On September 15 the Minister of Finance approached the Group and expressed a wish to continue the negotiations, and promised to refuse to accept any payments under the Crisp Agreement. On September 17, however, it was reported that £500,000 had been paid as a preliminary instalment of the Crisp Loan. On the same days at a secret session the Advisory Council approved of the resumption of negotiations with the Group, but stipultated that no agreement should be concluded without being submitted to the Council. It was reported that at this session the Council showed a readiness to accept supervision to a certain degree. The conditions proposed by the bankers had been modified somewhat, but the proposals included, as before, inspection of expenditures and the employment of foreign experts. In the Salt Gabelle a reorganization was proposed, and the Group was to be the Government's financial agent for a period of five years.

Matters were beginning to look hopeful and the Government asked for an advance of Tls. 1,500,000, but by September 23 the Government absolutely refused the Group's terms. These the Group declined to modify and another deadlock resulted. The attitude of the Government was doubtless due to the fact that the first half of the Crisp Loan had been floated, thanks to the underwriters. A fly in the ointment, however, was an official protest made by Sir John Jordan, the British Minister at Peking, against the Crisp Loan. At the same time Sir John Jordan presented a detailed list of China's floating liabilities which would become due at the end of the year, which totalled about £10,000,000.

A report by Mr. Hsiung Hsi-liang, who had ceased to be Minister of Finance, that post being taken by Mr. Chou Hsueh-hsi, to the President, was published about this time, in which he declared that after the admission of Japan and Russia to the Group on June 19 and the London Conference which followed, fresh and more onerous conditions were proposed. These he rejected, and proposed that the Loan should be reduced to £10,000,000. On July 7 he asked for an advance of Tls. 7,000,000 to relieve the provinces, but the Group declined. Mr. Hsiung thereupon ordered the provinces to make their own arrangements. This was his account of the events leading up to the deadlock, which was held in certain quarters to have justified the arrangement of the Crisp Loan.

When it became known that the refusal of the British Government to give official recognition had led to the practical failure of the Crisp Loan, hopes began to revive that China would see that it was in every way to her advantage to endeavour to conclude a satisfactory arrangement with the official Group. But a new element was introduced at this stage.

On October 8 it became known that Montenegro had declared war against Turkey and that the much-dreaded "War in the Balkans" was no longer a possibility to be feared, but a fact to be faced. It was inevitable that this should materially affect China's chances of obtaining financial accommodation. For years it had been believed that a war in the South-East of Europe would almost certainly lead to a general conflagration, and the fact that all the Great Powers were staggering under the weight of their military equipments was thought by many to favour the belief that war would be considered less costly than a continuance of armed truce. Naturally in the state of uncertainty that prevailed European capital was not likely to be sent abroad.

The political character of the negotiations, which had, of course, always existed to some extent, became greatly more marked from this time on. Broadly speaking it may be said that the policy of all the Powers in China, except America, was dictated henceforward by European exigencies. Even from the first there is reason to believe that the policy of Great Britain in China was largely dictated by her obligations to the other members of the Triple Entente, and naturally the necessity for adopting that course became the greater when the Balkan complications thickened. There are some who think that about this time the understanding between the diplomatic and financial representatives of the Powers in China, began to weaken and that thereafter the diplomats and the bankers regarded each situation that arose from a different standpoint.

The Belgian Loan for £10,000,000 for the construction of the Lanchow-Haichow Railway came upon the tapis at this period. The full terms of the Agreement for this Loan were published in the FAR EASTERN REVIEW of March, and it is therefore unnecessary to give them here. This did not, however, affect the negotiations with the Group which were still carried on.

A manifesto against the Six Power Loan was issued about this time by the Republican Party, the Nationalist Party, the Nationalist Association and the Republican Construction Debating Society urging a boycott of the Banks, but the appeal was unheeded by the sage business people. A notification was made by the Waichiaopu to Sir John Jordan that the Crisp Loan contract had been concluded, but the notification was refused. The Ministry of Finance meantime had sent to the Tutuhs a circular telegram stating that the proceeds of the Crisp Loan up to the end of the year would only amount to $26,000,000, while the total liabilities during the same period would reach $81,200,000.

A formal protest was made to China on October 29, both by the Powers and the Group, against the hypothecation of the surplus revenues of the Salt Gabelle to the service of the Crisp Loan as it was already pledged for the Indemnity. It has been stated that the Chinese Government deliberately allocated the revenue of the Tientsin Salt Gabelle in order to bring about the protest, with a view to making it impossible to carry out the terms of the Agreement with Mr. Crisp, and thus afford an opportunity to reopen negotiations with the Group. We give the statement for what it may be worth.

In any event, negotiations with the Group were reopened upon the initiative of the Minister of Finance on November 5, but the Crisp Loan proved to be a serious obstacle. The Group asked for the cancellation of Clause XIV of the Crisp contract, which provided that China could not close any other loans until the Crisp Loan had been entirely issued, and negotiations were opened between the Chinese Government and Mr. Crisp for a cancellation of the Agreement. Later it was announced that Mr. Crisp had received £150,000 for the cancellation of his rights. November ended without any finality to the negotiations being in sight. Mr. Hsiung Hsi-liang, who at this time held a characteristically Chinese post of "Financial Commissioner" with, apparently, power to float loans irrespective of the Minister of Finance, suggested an internal loan of $100,000,000, but this came to nothing.

December opened with negotiations still proceeding, but there was strong sentiment, vigorously voiced in the *Peking Daily News*, against concluding any loan to which Russia was party in view of the Urga Agreement by which Russia recognised Mongolia's autonomy. The *Peking Daily News* was then unaware of the existence of an old agreement between Russia and China whereby the former was accorded the right to be represented by an adviser in any scheme to supervise Chinas's finances. However, matters proceeded smoothly and the negotiations were making good progress on December 11. It was then announced that the Loan would be £25,000,000, and that if satisfactory terms were arranged the Government would give an undertaking to come to terms with Mr. Crisp. The question of supervision was to be solved by the institution by China of an Audit Department conducted on efficient lines under foreign officials selected by China. These terms were submitted to a conference of bankers in London, and on December 16 it was announced that with some slight modofications the proposals afforded a suitable basis for negotiation. The Advisory Council held a secret meeting on December 27, at which Mr. Chao Ping-chun, the Premier, and Mr. Chou Hsueh-hsi, Minister of Finance, were present, at which, it is stated by the Government, it was agreed that the Loan should be for £25,000,000, at five per cent., and that the Government could conclude it.

China, in view of the fact that the Boxer Indemnity was due, asked the Powers to agree to a postponement of the payment for a year, but Russia and Italy objected. The Indemnity was not paid, but the Legations attached no serious importance to this, as on December 30, when it was optimistically announced "the last details of the Six Power Loan were practicatly concluded," it was stated that the Indemnity would be paid as soon as the Loan monies were received.

It was freely rumoured during December that Russia was deliberately trying to stop the Loan by insisting upon immediate payment of the Indemnity and threatening to take measures towards foreclosure. Whether this be so or not she showed more insistence in this connection than the other Powers. There were other points that continued to prolong the discussions. One was the rate. China wanted 5% interest and a fixed rate of issue while the Bankers now wanted 5½% interest and six points below issue price, Another point raised, it is stated, by French and Russian interests furthur to delay the Loan, related to an adequate sum to be set apart from the proceeds of the Loan to pay for damage caused during the Revolution to foreign property. The sum named was £2,000,000. China objected at first and the point was discussed for days. The year 1912 ended with China on the edge of what correspondents called "the precipice of bankruptcy," and woeful stories of what would happen in the immediate future if China further delayed in arranging the Loan, were cabled abroad. An endeavour was made by the Government to come to an arrangement with Mr. C. Birch Crisp to advance the February instalment of his Loan which amounted to £1,780,000 by January 15, but although the Government thought that this could be done the arrangement was never completed. There was a misunderstanding, and the fact that China confidently expected that Mr. Crisp would pay over this money undoubtedly led her to assume a stronger attitude in the negotiations than she would have adopted had she known that her hopes of succour from this quarter were doomed to disappointment.

CHINA'S REORGANISATION LOAN.—Mr. Hsiung Hsi-liang, who was Minister of Finance when the Crisp Loan was contracted

However, notwithstanding the fact that there were strong rumours towards the end of December that considerable wire-pulling was being done by France and Russia, a step onward had been made by December 31, when the negotiators agreed that the general loan terms were satisfactory and that the Agreement could be printed. China asked for an immediate advance, and the Groups wired home for instructions.

The anxiety of the Government to obtain funds is easily understandable when it is remembered that the Boxer Indemnity was in arrears to the extent of £3,000,000, and that there were numerous other obligations entirely unprovided for. The advance was not made, as there were several points still unsettled. China had not yet agreed to set apart £2,000,000 for compensation for damage during the revolution and she demanded a rate of 89 for the 5 per cent. loan instead of 88. The question of auditors was to the front at this stage and the diplomats were playing a much more prominent part in the negotiations than before.

The Government wished to meet the views of the diplomats if possible, but it was anxious that anything relating to the advisers should not be mentioned in the actual Agreement, fearing condemnation by their own people. The general impression at this time was that the Agreement would be signed. The Government were asking for an advance of £5,000,000 and the Banks had agreed to give them £2,000,000 as soon as the Loan was signed.

On January 6 France declined to make any monetary advances at all in view of the dangerous tension in Europe, and this prevented the advances, to which all the other Powers had agreed, from being made. The negotiations still dragged. France, Russia and Germany evinced an indisposition to commit themselves to an acceptance of the proposals.

On January 17 the Group informed the Government that owing to the European situation they could not guarantee that advances would be made on any particular date. In his reply Mr. Chou Hsueh-hsi pointed out that advances of two sums of £2,000,000 and one of £3,000,000 had been definitely promised for certain months, that it was absolutely necessary

that the Government should have money and that unless the advances were made at once the Government would feel themselves at liberty to contract loans from outside the Group.

Fruitless efforts then began on the part of the Chinese Government to obtain loans on the terms previously agreed to by the Group from the numerous representatives of financiers who infested Peking. It had been cynically remarked that at that period every second man in Peking represented "the strongest financial syndicate in the world," and had assured the Minister of Finance that he could raise with ease £100,000,000 for China on her own terms. When it came to a show down, however, it proved to be a show up for these optimistic agents, and no loans materialised.

The Advisory Council about this time authorised a 6 per cent. domestic loan, of which something more was heard in February. In regard to this loan, however, the disinclination of the Chinese to invest their savings in Chinese Government securities was once more shown. Discussions had been going on before this among the diplomatic body in regard to the Indemnity, and it had been finally decided that the amounts lying in the banks at Shanghai should be divided among the claimants.

Although several people were at this stage offering loans to the Government, negotiations with the Group had not been officially broken off. The points at issue were: appointment of auditors and compensation for losses during the Revolution. Early in January the Minister of Finance and the Minister of Foreign Affairs had agreed in principle to the appointment of auditors, but had said that "China would agree to the payment for losses during the Revolution in the fighting areas, but not elsewhere, whilst the question of auditors would be referred to later." The Government were still extremely anxious that there should be no reference to supervision in the Agreement on the plea that the Assembly would probably object. This is interesting in view of the fact that in May the Government claimed that the Agreement had passed the Assembly in December.

(The diplomats were taking the most prominent part in the negotiations at this stage) The French and Japanese Ministers were appointed by the diplomatic body to interview the Minister of Finance and the Minister of Foreign Affairs and to endeavour to secure a settlement of the outstanding difficulties. The French Minister, however, still insisted upon the original terms in connection with losses during the Revolution and in regard to the auditors.

There were indications towards the end of January that the Group was in danger of breaking up. The British and Germans showed signs of a desire to break away and opened up direct negotiations with the Minister of Finance. These went on for some days, and by Januaary 25 the British and German bankers had prepared a letter setting out certain proposals to be sent to the Minister of Finance. The French Bank Manager objected however, saying, it is reported, that if the letter were sent in he would offer better terms and take over the whole loan. These negotiations then dropped.

In the meantime independent financiers were endeavouring to get a footing, and Mr. Crisp made an offer, which, however, was rejected. Pressure was being brought by the Chinese Government to bear upon Mr. Crisp to pay immediately the balance of the first half of his loan, which was due in February.

By January 27 there was a better feeling between the Government and the Group, and it began to be hoped that the long negotiations would be brought to a satisfactory conclusion. The terms in regard to the Agreement itself and to advances had been arranged and the only question of importance outstanding was in regard to appointing the foreigners in accordance with the Agreement. The French Minister insisted upon supervision and also demanded that France should be allowed to place the bonds at a rate that would compensate for the tax imposed in France for listing bonds.

By January 31 the question of foreign advisers had been practically settled, China agreeing that they should be appointed upon joint consideration and finally approved by the Foreign Ministers. It was a matter of general knowledge that Herr Rump, a German, Mr. J. F. Oiesen, a Dane, Signor Rossi, an Italian and Mr. T. T. H. Ferguson, a Dutchman, were the four from whom the selection would be made, and there had been no indication up to this time that exception would be taken to the appointment of any one of them. Admiral Tsai Ting-kan had already been appointed Chief of the Salt Inspectorate.

January ended therefore with the belief prevalent that before the Chinese New Year (February 6) the contract would be closed, but certain correspondents still despatched most apprehensive cablegrams in regard to the fate of the country if money were not forthcoming by the Chinese New Year, while pessimism ruled in Peking and the country generally.

On February 3 it became definitely known that the final arrangements were that the Loan was to amount to £25,000,000 at 5½ per cent. and that the bonds were to be issued at 96½ in London and at 97½ in Paris. Amortisation was to begin in the sixteenth year, China to have the option of redeeming or converting after the fifteenth year on six months' notice. In regard to advances the Group agreed to give £2,000,000 immediately the contract was signed, a further £2,000,000 in February and £3,000,000 in March. The first advance of £2,000,000 was to be made against Treasury Bills bearing interest at 7 per cent. and was to be shared equally by the six banks. Although the French were trying to secure the appointment of a Frenchman as one of the advisers, it was generally believed that the Loan would be signed on February 4.

In the afternoon of February 4 Admiral Tsai Ting-kan waited upon the various foreign Ministers and told them that the proposed advisers were Mr. Oiesen for the Salt Gabelle, Signor Rossi for the Audit Department and Herr Rump for the Loan Department. At six o'clock that evening a meeting of the Foreign Ministers was held, at which these names were considered. The French Minister said that a French adviser should be included. It was pointed out that the advisers were independent, but the French Minister claimed that as Herr Rump was a German he could not be considered independent. The British and American Ministers declared themselves agreeable to the nominations. There was considerable discussion, the French Minister insisting that as France would supply the bulk of the money it was only right that she should be represented by an adviser. The suggestion was made that there should be two advisers to each post, but another proposal put forward was that as Great Britain, France and Germany would supply the bulk of the money, they should share the three posts. The Russian Minister pointed out that as the bulk of the Boxer Indemnity, which was charged upon the Salt Gabelle, was due to Russia, and inasmuch as Great Britain already had the Customs and France the Post Office, a Russian should be appointed auditor. Finally it was decided that the Ministers should telegraph to their respective Governments for instructions.

It was understood that China might be prepared to suggest Mr. T. T. H. Ferguson, whose name had already been mentioned, instead of Herr Rump, but it was thought very unlikely that the German Minister would agree to Herr Rump being set aside in the circumstances. It is interesting to recall that the French Minister had some time previously objected to the nomination of Mr. Oiesen on the ground that no Danish money was being invested, though he subsequently withdrew the objection. On the other hand, exception was taken to Herr Rump because German money was being invested. The action of the French Minister was bitterly denounced by the Chinese press. "All illusions concerning the sincerity of French professions of disinterested friendship for China were rudely shattered by the unexpected developments which occurred in what was believed to be the final phase of the negotiations yesterday," declared the *Peking Daily News* of February 5 and elsewhere in the same article the opinion was expressed "That she (France) will now share to the full the hatred which Russia's actions have engendered in the minds of all patriotic Chinese is the least retribution that can overtake her." The French were, however, unperturbed. One prominent Frenchman declared that

the French attitude was a sound one and that France did not care a flip if the *Peking Daily News* urged the Chinese to hate France and boycott her. France, he said, had nothing to boycott, and French money would be restrained from coming in until ample safeguards were secured.

On February 5 the Minister of Finance presented a Note to the Group stating that China now felt that she was free to go elsewhere for money. The Government telegraphed to the Chinese Ministers abroad telling them to endeavour to arrange for loans. Negotiations were opened up with the London City and Midlands Bank for a loan of £10,000,000, but they came to nothing owing to the non-support of the British Government. The Chinese Minister in London telegraphed to his Government that no money was available unless negotiations with the Group were definitely and finally broken off.

The diplomats were still discussing the complication, and it was suggested that there should be a British adviser to the Salt Inspectorate, a German to the Loan Department and joint French and Russian advisers to the Audit Department. This proposal was at first objected to by the German Minister.

The President on February 20 promulgated the regulations governing the issue of 6 per cent. bonds to the extent of $200,000,000, to which reference has already been made. The money was to be used to provide capital for the Bank of China; to pay off various small loans and to redeem provincial notes.

The following day it was reported that the Minister of Finance had submitted a secret memorial to the President advocating an immediate and final rupture with the Group. This was the unhappy state of affairs at the end of March.

It was believed that Germany would agree to the appointment of a British subject to the Salt Gabelle if Germany were given control of both sections of the Tientsin-Pukow Railway, but the suggestion was not received favorably by Great Britain. A meeting of the diplomats was held on March 3, and at this gathering Germany withdrew her objections to the appointment of a British Adviser of the Salt Gabelle on the understanding that a German would be appointed as co-Director, with another German Adviser to the Loan Department, and a Frenchman and a Russian to the Audit Department. In regard to the Tientsin-Pukow Railway, the British said that that matter could be discussed on its merits later on.

The Chinese were very indignant at these proposals, and their indignation knew no bounds when they were submitted formally to the Government, and it was found that the expression foreign "Directors-General" had been employed instead of "Advisers." Although it was explained that a mistake had been made, the Chinese continued to believe that the misdescription was intentional and betrayed the real object of the diplomats. On March 8, however the *Peking Daily News* officially stated that matters had not been affected by the "mistake" in the designation of the advisers.

China's Reorganisation Loan.—Mr. Chou Hsueh-hsi, who was Minister of Finance when the Reorganisation Loan Agreement was finally signed.

The Minister of Finance wrote to the Group on March 11 recapitulating the efforts that had been made to reach a conclusion of the negotiation and pointing out that, after the Group had expressed itself themselves satisfied with the foreigners it was proposed to appoint, they had not signed the contract, although they had agreed to do so. (This letter and the reply from the Group were published in the March number of the Far Eastern Review and consequently need not be quoted textually). Mr. Chou's letter did not definitely break off negotiations and the Group in their reply expressed the hope that at an early date it would be possible to carry them to a successful conclusion. On the same date the Group sent a letter to the Minister of Finance in the following terms:—

"We beg to point out to you that payment has become due of Treasury bills for the provisional advances made under the letters of agreement dated February 28 and March 9, 1912, supplemented by subsequent correspondence fixing sterling amounts and the rates of exchange between the sterling and other gold currencies as follows:

Due Feb. 28,
1913, £48,798 15s 11d.
Marks 999,643.42
Francs 1,232,413 60
U. S. Gold $237,894.13
Roubles 463,198.21
Yen 480,480.42

Due March 9,
£26,426 8s 7d.
Marks 541,345.32
Francs 667,399.36
U. S. Gold 128,828.84
Roubles 250,839.63
Yen 260,198.69

We have the honor to ask that you will be so good as to notify us on an early date of the arrangements made by the Chinese Government for the payment of the above amounts.

We have to add that under instructions from our Groups interest at the rate of 7½% per annum is chargeable upon the above amounts from their due dates until date of payment."

On March 18 the Minister of Finance replied to this letter stating that owing to the large loan not having been concluded the Chinese Government found itself unable to repay the Treasury Bills and expressing a desire that they should be renewed for another term of one year or six months.

The representatives of the Group replied on March 19 as follows:—"We have the honor to acknowledge receipt of your letter of yesterday's date, from which we note that owing to the large loan not having been concluded the Chinese Government finds itself unable to repay the Treasury Bills representing the advances of February 28 and March 9, 1912, which became due on corresponding dates of this year, and that you desire that these shall be renewed for a further terms of one year or six months.

In reply we have to state that we do

not feel in the position to lay this request before our Groups, unaccompanied as it is by any definite statement of the arrangements which the Chinese Government has in view for the payment of these amounts, asked for in our letter to you of the 14th.

We regret, therefore, that it becomes necessary for us, in conformity with the usual procedure, to notify our Legations of the failure of the Chinese Government to meet the obligations in question."

At a later date the Groups notified their respective Legations as above.

The object of these letters was evidently to impress upon the Chinese Government the fact that it was in default and that consequently there was an element of danger in the independent negotiations then being carried on.

The Government were, however, bending every effort to raise loans in other quarters. There seemed to be some prospect of obtaining a loan from the Kailan Mining Administration, but this fell through owing to the non-support of the British Government and a similar fate overtook other proposals. Mr. Crisp offered to raise £20,000,000 if the rate of interest on his original loan of £10,000,000 was increased to 5½ per cent. If that were done, he said, he would issue immediately the second half of his original loan and the other £10,000,000 very shortly. The Chinese Government rejected the proposal.

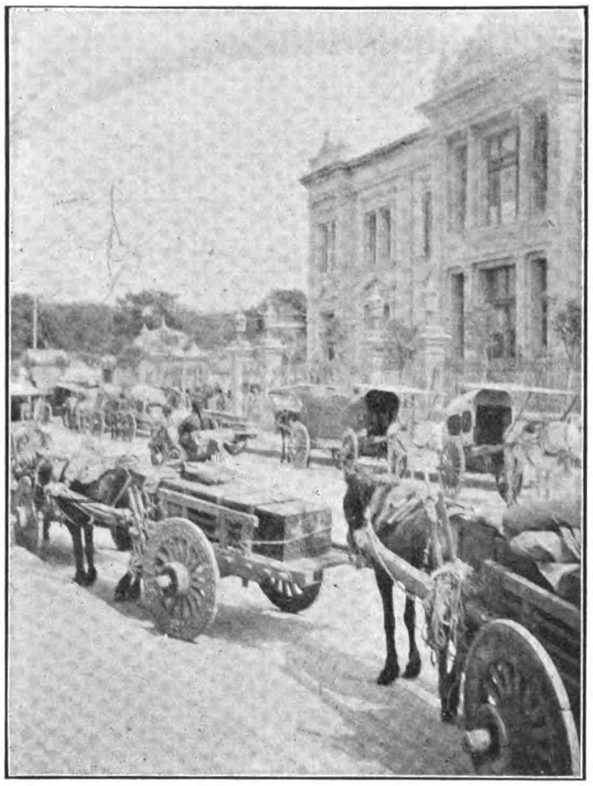
On March 18 the American Group withdrew from the Consortium in circumstance which were described in our March issue. In many quarters it was believed that the Group would break up in consequence of the withdrawal, and there was renewed activity among the independent lenders.

An international syndicate composed of English, French, Belgian, Dutch and American Banks began seriously to negotiate with the Minister of Finance. Another syndicate, headed by Reuter's Telegram Company, was also in the field, both working secretly and unbeknown to the representatives of the Group.

Upon the suggestion of the Chinese Government the syndicates joined forces, and on March 25 a draft agreement was drawn up and signed by the Peking representatives of these syndicates. This loan was to be for £30,000,000 at 5½ per cent. and the Crisp Loan, which was to be converted to one of 5½ per cent., was to be taken over by this Loan. Later Reuter's withdrew, the explanation given being the interference of "political influence." The international syndicate continued negotiating and things progressed so far that the draft agreement was printed and the prospectus prepared for issue. Everything was ready to be signed on April 25, the day before the Big Loan was signed.

The knowledge that these negotiations were nearing conclusion may not unlikely have hastened the dramatic proceedings which took place on April 26. However that may be, at the last moment the Chinese Minister in London informed the international syndicate that he had been ordered not to sign an agreement with them, and although the syndicate wired to Peking that it was ready to complete the arrangement the Minister of Finance did not accept the offer, informing the Peking representatives that it would not be expedient for the Government to do so and urging him to permit the Government to cease negotiations.

Relations between the Group and the Government became very strained after the disappointment on February 4 and when in March the Americans withdrew, it began to be freely prophesied, as



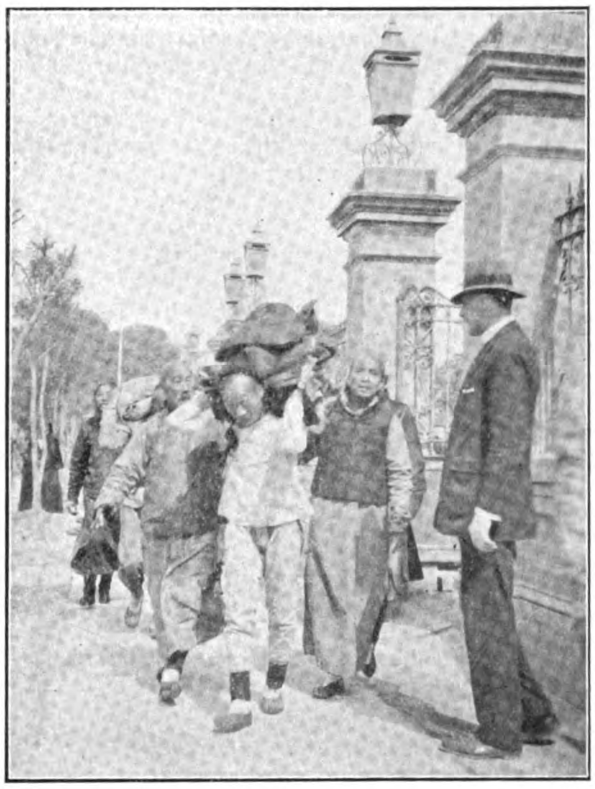
China's Reorganisation Loan.— Peking Carts waiting outside the Russo-Asiatic Bank, Peking, to be loaded with silver dollars.

already mentioned, that the end of the Consortium was in sight. But an intermediary affected a reconciliation and, as we have stated, facts were brought to the attention of the Group which caused them to hasten the signing of the Agreement.

It was reported on April 24 that the Russians were again trying to block the Loan, but the British insisted that it should be concluded. The Minister of Finance suddenly departed for Tientsin on April 24, it was said to avoid signing the Big Loan, but there is ground for supposing that he had another object in view. A special train with four delegates from the President was sent with peremptory orders for him to return. He returned by the special train on April 25.

An impromptu meeting of leaders of the Kuomingtang decided to send letters to the President urging that the Loan should be put before Parliament. The next morning, however, it became generally known that the Loan was actually to be signed that day. There was much activity in consequence in political circles, and early in the morning the Speaker and Vice-Speaker of the Senate sent letters to the President and Minister of Finance again urging that the matter be put before Parliament. The President replied that permission had been given by the Advisory Council and that, therefore, there was no need to take the course suggested. He said that he was sending Mr. Liang Shih-yi, his Chief Secretary, to explain. The Senators waited for Mr. Liang from 10 a.m. until 4 p.m. when he arrived and stated that the Government was justified in going ahead, and that the Loan had been signed. As a matter of fact the Agreement had been initialled, but not signed, and the Senators learned that the formal signing would take place that night (April 26) at the Hongkong and Shanghai Bank. The Vice-Speaker of the Senate called upon the Manager of the Hongkong and Shanghai Bank after 9 p.m. and there met three of the other bankers. He urged that it would be an unconstitutional procedure to sign the Agreement before it was submitted to Parliament. The bankers replied that they could only deal with the Government. The Government had ordered the signing of the Loan and their Ministers had instructed them to go ahead. They dealt with the Government through the ordinary channel, the Waichiaopu, and could not do anything but sign the Loan since the Government had agreed and the Foreign Ministers had approved. The Senators further discussed the matter and decided again to see the bankers. At about 11 p.m. the Speaker, Vice-Speaker and one or two others went to the Bank and sent in their cards. They were told that Mr. Hillier, the Manager of the Hongkong and Shanghai Bank, was in conference with the representatives of the Government and could not see them, whereupon they went away. The statement in the press that they hung about outside the the Bank is inaccurate.

The Premier and Minister of Finance met the bankers at the Hongkong and Shanghai Bank as arranged on this night (April 26) and the Agreement was then gone through finally preparatory to signing. When Clause 17 was reached (in the original Agreement this clause set out that the Government would not proceed to the issue of any loan or loans having a Government guarantee, concluded latter than December 1, 1912, for a period of six months after the complete issue of the present loan) the Minister of Finance asked if the date could be



CHINA'S REORGANISATION LOAN.—Coolies carrying bags of dollars to the Peking Carts. Outside of every bank at Peking on the days following the issue of the loan funds to the Chinese Government, coolies were to be seen staggering under bags of dollars.

changed to April 10, 1913. When the bankers asked why this should be done the Minister admitted that he had signed a loan with Austrian financiers on that date (details of which we give elsewhere). After this disclosure the bankers would only sign the Loan with reservations, as it was necessary to refer this development home. This reservation permitted the bankers to withhold payment of the advance of £2,000,000, which would otherwise have become payable as soon as the Agreement was signed. The actual loan contract with the reservation mentioned was signed at 11 p.m. on April 26, but the numerous other documents kept the parties busy until 3 a.m. on the 27th, (the day of universal prayer for China) when the conclusion of the long delayed Agreement was celebrated by a toast.

The Premier had been alarmed at the feeling aroused in Kuomingtang circles when it was known that the Loan was to be signed that night, and arranged by telephone from the Bank that detectives armed with revolvers should be posted in the dark corners in Legation Street. Outside the Legation quarter, the whole street was lined with guards so that the Premier and his colleague could drive home safely. They left the Bank at full gallop and continued at this rate for the whole journey to escape the effect of any bomb which might be thrown. There is, however, no reason to suppose that there was any justification for fear that violence would be offered.

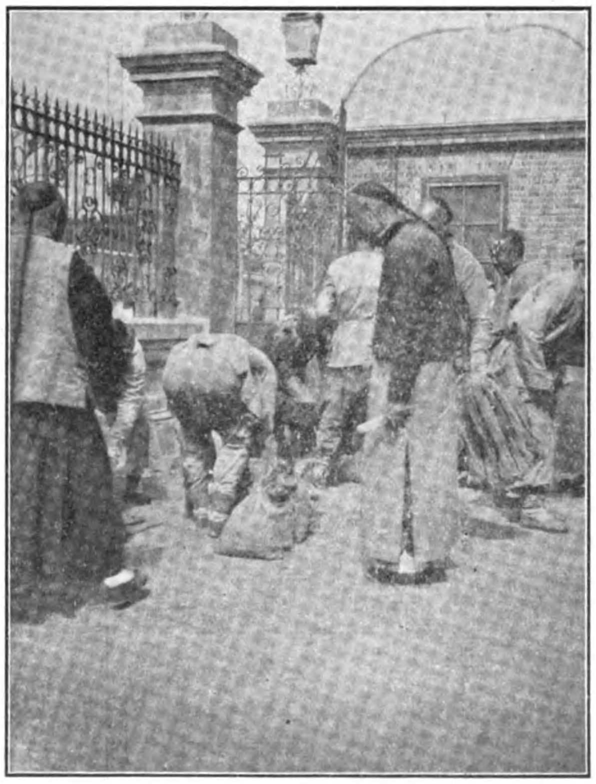
The disclosure of the fact that the Austrian Loan had been signed very nearly wrecked the Loan at the last minute and did prevent any advances being received until May 10 when some $200,000 was handed over.

The following despatch from the Provisional President was sent to the Senate on May 7, 1913.

The Minister of Finance has submitted to us a statement to the following effect:—

"The Big Loan was concluded in the knowledge that it is absolutely indispensable to the existence of the State. Negotiations between the Government and the Banking Groups had been in progress for a long period and the whole nation realised the exigency of the case. There had been no objection to the loan. We were slow to carry through the Loan only because the terms were very severe. We constantly sought to secure better terms in order to lighten the nation's burden. The interest of the nation had ever been before us. With this view in mind, the negotiations continued for several months, but no definite settlement was arrived at. During September of last year, the essential points of the Big Loan, as decided upon by the Cabinet, were referred to the former National Council. The National Council deliberated upon the subject and approved the terms. Then we carried on the negotiations with these terms as a basis. Numerous changes took place, and more than once the negotiations were interrupted on the brink of consummation. During the latter part of December last year, the Russian Minister pressed for payment of the Boxer Indemnity.

The draft of the Agreement was just then completed, and on December 27th, Premier Chao and I attended the former National Council and reported the past history of the loan negotiations and the pressing demands made by the Russian Minister. The Agreement, with its articles classified according to their nature into special and ordinary ones, was laid before the Council. Each of the special articles was separately passed by the National Council. The Speaker asked the Council whether they would pass the ordinary articles. The Council considered that it was not necessary to pass these, which means that they approved them all and desired the Government to proceed with the negotiations along the lines laid down. Therefore we were fully prepared to sign the Agreement on December 29th in order to avoid undesirable complications. But things took an unexpected turn. On account of the Balkan War, and the consequent financial strain on the European market, which occasioned the rise in rate of interest, and other matters, the Banking Groups upset all the terms previously agreed upon. With new obstacles thrown in the way, negotiations proceeded with utmost difficulty. Several months' efforts led us no nearer to any satisfactory settlement, and the chances of success were very slender. Indeed, at one time things were so hopeless that we believed the whole proposition would break. But things again changed. It was very fortunate for us that the Banking Groups acquiesced in our terms. The main points of the Loan Agreement we signed were similar to those of the original draft. This was more than the Government had dared to hope. The vicissitudes we underwent and the international complications that dogged the steps of the loan negotiations at every turn were tales too bitter to be recounted. The Government is to serve the people, and to promote the interests of the nation. What has continually been in our mind is to insure the safety of the nation, and while we were absorbed in our efforts to achieve this object, we regard very lightly any accusation that may be flung to us. Since the establishment of the Provisional Government, although the foreign nations have not recognized us as a state, yet we have inherited the obligations of debt from the former Ch'ing Dynasty. The outstanding foreign loan charges, the Boxer Indemnity at the end of last year, and the loan and Indemnity charges due at the present moment, amount to about £12,000,000, and the foreign nations have pressed for payment. If the credit of the nation were not maintained, we tremble for the stability of the nation. Whenever we think of this, we are greatly pained at heart. Moreover, further delay of payment would evoke forcible interference in the administration of our national taxes which served as securities to the various loans. Then foreign supervision of our finance would actually begin and the Republic would be in danger of bankruptcy. If any such thing comes to pass, how can the Government bear the responsibility of it? To allow events to take such a turn without finding means to avert the calamity would be a crime irredeemable. The Loan was an absolute necessity. The signing of the Loan Agreement was brought about by force of circumstances. The fact that the loan was concluded in accordance with the bill passed by the National Council evinces the respect the Government holds for the Parliament, and there is no ground for the accusation that the Government had slighted the Parliament in any manner. As for the contention that the procedure in connection with the signing of the loan was imperfect, we would point out that the session of the Nation-



CHINA'S REORGANISATION LOAN.—Coolies taking delivery of sacks of dollars at the Russo-Asiatic Bank, Peking, for transportation to the Government Treasury.

al Council on December 27 was a secret one, and as a precautionary measure, the Government took up the bill orally, instead of in writing. It was repeatedly announced that the bill was taken up by the order of the President. Considering the grave nature of the bill, can it be possible that the bill was taken up in the name of my private person and without being duly authorized by the President's order? Then the fact that the articles of the Agreement were separately deliberated and passed establishes it beyond doubt that it was not a mere report that was made during that session, and that it was a bill properly taken up. Any doubt on these points can be cleared by close examination of the record contained in the agenda-book of the National Council. As to the charge that the bill had not undergone the regular procedure of the three readings, I wish to say that at the time when the articles of the Agreement were read, I requested that this bill be passed at one sitting and that the procedure of the three readings be dispensed with, which were agreed to by the Council. It was quite in accordance with the 38th Clause of the National Council Regulations regarding the elimination of the Three Readings procedure at the request of the Government. The date of signing the Agreement was also announced at the time and no objection was raised. If there were no change of mind on the part of the Banking Groups, this Agreement would have been signed on December 29th. The above statement is made not in an argumentative spirit to advance our excuses, but as a plain recital of facts. At this juncture when the financial conditions are most stringent, and the debt claims are pressing, if the Big Loan is not concluded, the foundation of the nation will not be firm. The Agreement, already signed, cannot be cancelled. If the Parliament would appreciate the difficulties the Government is labouring under, and approve the act, it would be the good fortune of the state. If not, the only way open is for us (Minister of Finance and Premier) to apologize to the representatives of the people, and take the fault upon ourselves, thus to clearly establish the responsibility."

The above statement, submitted by the Minister of Finance, is now referred to your esteemed House.

The despatch was signed by Tuan Chi-jui, Acting Premier.

NATIONAL COUNCIL AND LOAN

The following is an abstract from the official records of the National Council, dated December 27th, 1912:—

Chairman announced that a Secret Meeting be held.

Premier Chao Ping-chun reported matters.

Time for rest came.

Chairman proposed that they would not take any rest. All the members agreed.

Minister of Finance reported matters.

Chang Yao-tsen, Waung Yung-pao, and Liu Yen motioned that the general idea of the special articles of the bill be decided.

Chairman asked the House whether they agreed to this motion. The whole House agreed, and the motion was carried.

Article 2.—According to Original Text.

Chairman called for decision by raising of hands. Passed by majority.

Article 5.—According to Original Text.

Waung Yun-pao proposed that it would be best if this Article be cancelled. If this could not be done, put it in the Addenda. If this again could not be effected, the original text may be used.

Chairman called for decision by raising of hands. Passed by majority.

Article 6.—According to Original Text.

Chairman called for decision by raising of hands. Passed by majority.

Article 14.—According to Original Text.

Chairman called for decision by raising of hands. Passed by majority.

Article 17.—According to original text.

Chairman called for decision by raising of hands. Passed by majority.

Chairman proposed to the House that the Ordinary Articles need not be decided. All the members agreed.

Chairman announced that Meeting was adjourned. It was 5.55 p.m.

Opposition to the Loan was voiced in the Parliament and in many parts of the country and both Houses of Parliament passed resolutions declaring that the method of signing the Loan was unconstitutional. There is some doubt as to the legality of the vote in the Lower House. The Speaker and Vice-Speaker of the Senate sent telegrams to the Tuhuhs urging that the Loan was not binding upon China and Dr. Sun Yat-sen wired to London newspapers declaring that to supply the Chinese Government with funds at that juncture would probably result in civil war. The opposition was not without its effect and even after the signing of the Agreement, so late in fact as May 8, the Minister of Finance was contemplating measures to break it off. However it survived, and, with the payment of the advances has become *un fait accompli*. It has been arranged that the Austrian Loan will not be floated until three months after the Big Loan. The latter was issued on May 21 and several days before it was reported that there were indications that it would be unnecessary for any underwriting to be done. The amount offered in London was £7,416,680, in Paris £7,416,600, in Germany £6,000,000, in Russia £2,777,773, and in Belgium £1,388,887. Of the amount offered in London it was announced in the prospectus that £3,000,000 had been applied for before the issue. The lists were to remain open for three days, but were closed within an hour of opening. The Loan had been many times over subscribed, and after closing was quoted at one per cent. premium, sellers.

It has already been announced that it will not be long before China comes in to the market again for a large loan for economic purposes, as the Big Loan, after the satisfaction of matured obligations, including the Boxer Indemnity, the Belgian Loan, the advances from the Six Power Group, etc., will leave little enough available.

No-one who has followed the course of China's loan negotiations since the beginning of the provisional Republican Government, can fail to be struck by the fact that both at the beginning and end, the big Loan Agreement nearly came to grief through China's inveterate habit of financial double-dealing. At the beginning the negotiations were hung up because Mr. Tang Shao-yi contracted the Belgian Loan. There was no necessity for the loan—the Four Power Group, as it was then, was quite prepared to finance China from month to month—and moreover the security for that loan was the Peking-Kalgan Railway which, for obvious reasons, it was extremely undesirable should be hypothecated, particularly to the Belgian Group. The only possible explanation is that a certain amount of money could be obtained without questions being asked as to the expenditure. Again the negotiations were almost wrecked at the last moment by the discovery that the Austrian Loan had been signed. There are two agreements (which will be found elsewhere) signed with Austrian financiers. They provided for loans of £2,000,000 and £1,200,000 in consideration of the purchase respectively of 12 torpedo boats from the Stalilimento Tecnico, Trieste, and 6 torpedo boats destroyers from the Vulcan Shipbuilding Works, Stettin. The torpedo boats are to cost £66,150 apiece and the destroyers £145,057. The actual amount of cash to be paid to China amounts to £1,413,000 and the loans carry 6 per cent. These agreements were never placed before the Parliament, and the Senate has interpellated the Government asking why the Parliament should first hear of them from outside sources, and demanding to know why these obligations were assumed.

It is not without interest to remark the effect of the conclusion of the Belgian Loan in March, 1912. A security that should never have passed out of China's hands was hypothecated and the opportunity of dealing with the Four Power Group was lost. The inclusion of Russia and Japan in the Consortium would probably not have occurred had it not been for the Belgian Loan, and America would not have withdrawn, as the Loan would have been concluded before the new Administration at Washington assumed office. The net result of the conclusion of the Belgian Loan was to bring in to the Group Russia and Japan, and eventually to drive America out. Moreover, the finances of the country drifted from bad to worse and wild-cat financing of the Crisp type became, or was considered, necessary. Notwithstanding the grave lesson taught by the Belgian escapade the Government light-heartedly risked wrecking its chances to obtain the large sum so urgently needed in order to obtain the trifling amount to be realized from the Austrian Loan. What will be the outcome of the latter escapade so far as Parliament is concerned cannot be prophesied. It is certain that the Government will find it hard to give a satisfactory explanation of its action.

THE AUSTRIAN LOANS

As has been pointed out in the main article much astonishment was caused the Bankers on the evening of April 26 when they were informed that two loans had been signed with Austrian financiers for £2,000,000 and £1,200,000 respectively. The discovery came about when clause 17 of the agreement was being considered. That article stipulated that the Chinese Government shall not for a period of six months after the complete issue of the big loan, proceed to the issue of any other loan having a Government guarantee concluded later than December 1, 1912. The Minister of Finance asked that the date be altered to April 10, 1913, and when the bankers asked to know why a change should be made, the Minister confessed to the signing of two loans on that date, which could claim

priority of issue. He declined to state then with whom the loans had been contracted, and merely mentioned the amounts. It was later discovered with whom the contracts had been made, and that a large sum was set aside for the purchase of torpedo boat destroyers After much discussion the bankers agreed to sign the big loan provisionally, pending instructions from the head offices, with whom they communicated by telegraph, informing them of the loans mentioned. An effort was made to have the Austrian firms taken into the Group, but that was not entertained. Discussion of the subject was carried on from April 27 until May 9 before any settlement could be come to, and then the big loan was ratified on the understanding that the Austrian loans would not be floated until three months after the big loan had been issued.

The terms of the Austrian loans indicate how desperate the Government was in its search for money, as they show that the Government was prepared to pay large sums for torpedo boats for which there is absolutely no need merely in order to obtain ready money.

THE £2,000,000 LOAN

The agreement for this loan sets out that Chou Hsueh-hsi, Minister of Finance, was authorised to act for "and on behalf of the Chinese Government and with the sanction of the National Council," that sanction being defined as sufficient on the ground that the Minister of Finance had already "obtained the sanction of the National Council to a loan for the equivalent of £20,000,000, and the above loan shall be deemed to be made in pursuance of such sanction and to constitute part of such loan." Messrs. Arnhold, Karberg & Co. acted on behalf of "a group of Austrian bankers," who agreed to lend £2,000,000, "part of which is to be applied to the purchase of certain torpedo boats," the amount sufficient to make the payments for the boats to be retained by the firm. It was stipulated that the Minister of Finance should obtain the issue of a Presidential Order approving the terms of the loan, which were, briefly as follow.

Payment.—Within 45 days of the final settlement of the contract the sum of £1,206,200 was to be paid to the Chinese Government, the balance of £793,800 to be held by the firm "to be applied in payment of the said torpedo boats as provided in the subsidiary contract."

Discount.—8 %, equalling 92.

Interest.—6% payable half yearly, the first payment to be made on June 30, 1913; interest on balance of £793,800 at 6 % to be paid to Government on all sums for the time being in the hands of the firm.

Repayment.—To be made in five years from January 1, 1913, namely: £666,500 on December 31, 1915; £666,500 on December 31, 1916; £667,000 on December 31, 1917.

Security.—The annual revenue derived from the tax on the transfer of title deeds, estimated yearly about $10,000,000 (subject to the rights of a prior charge held by the loan of £300,000 concluded with the Poldi Huette, Vienna, on March 1, 1913.) The Government will make good any deficit from other sources of revenue. "The security is hereby transferred to an amount sufficient to cover the annual amortisation and interest to the Austrian Minister." So long as interest and repayment are fully paid there shall be no interference in the administration of the tax by the Austrian Minister. The loan shall have priority over all other loans with regard to the title deed tax, and no loan shall be concluded which shall impair the security of this loan.

Price of bonds.—£500. Bonds to be redeemed as follow:

No. 1 to 1333 on December 31, 1915
No. 1334 to 2666 „ „ 1916
No. 2667 to 4000 „ „ 1917

When bonds are drawn for redemption payments are to be made at the K & K priv. Landerbank, Vienna, to which bank funds for interest and amortisation are to be remitted by the Chinese Government fourteen days before due date.

Signature.—The contract was signed by the Minister of Finance and Messrs. Arnhold Karberg & Co., at the Austrian Legation.

CONTRACT FOR TWELVE DESTROYERS

The separate subsidiary contract for twelve torpedo boat destroyers, in connection with the above loan, was made between the Board of Navy, represented by Admiral Liu Kuan Shun, Minister of the Navy, and Messrs. Arnhold, Karberg & Co., on April 10, 1913, the boats being ordered "in consideration of the separate loan agreement for £2,000,000."

Type.—The contract sets out that "the twelve Torpede Boat Destroyers shall be all of the same type and construction as the boat already supplied by the Stabilimento Technice, Trieste, to the said Board, that is to say the machinery shall be of modern type, the capacity to be 400 tons, speed 30 knots, length 67 meters, horsepower 6,000 H.P. and all further particulars, arrangements and special contract conditions shall be exactly the same as agreed upon for the boat already supplied by the Stabilimento Works."

Armament.—The armament shall consist of One 12 pound Cal. Skoda Q. F. Gun with 200 rounds of ammunition. Seven 3 pound Skoda Q. F. Gun with 300 rounds of ammunition for each Gun. Two Torpedo Deck Tubes of 18 inches with 4 Torpedo-type Blackhead (Schwarzkopff-Berlin).

Price.—The price for each boat shall be £66,150 (say sixty-six thousand one hundred and fifty pounds sterling nett).

Delivery.—The Boats shall be delivered at as Trieste as follows:—

During 1914	2 boats.
During 1915	5 boats.
During 1916	5 boats.
	12 boats.

If so desired by the Board, the firm is prepared to deliver the said Destroyers at the Chinese port, but all risk and expenses connected therewith will be borne by the Board.

Payments.—Payments are to be made as follows:—

£ 16,500 for each boat to be paid after the definite settlement of this contract.
£ 16,500 for each boat to be paid one week after the launching of the respective boat or boats.
£ 16,500 for each boat to be paid one week after successful trial of the respective boat or boats.
£ 16,500 for each boat to be paid when handing over at Trieste the respective boat or boats.

The Board of Navy shall be at liberty to send deputies to the Shipbuilding Yard of the said firm to superintend the construction of the Destroyers and to take delivery of same when completed.

Should the Chinese Government during the life of the agreement desire alteration in the design or in type of the Vessels contracted for by which a difference in price (to be a diminution of, or an addition to, the contract price) might occur, it is mutually agreed that the two contracting parties shall each appoint one deputy, who in mutual consultation shall settle the difference in price so occurred. Should the two deputies fail to come to an understanding both parties will then appoint an impartial third party, whose decision shall be final.

THE 1,200,000 LOAN

The contract for the second loan of £1,200,000 was in terms very similar to the foregoing one for £2,000,000 and was signed on the same date.

Payment.—Within 45 days of the final settlement of the contract the sum of £329,658, being part of the proceeds of the loan, must be paid to the Government, the balance of £870,342 to be held by the firm to be applied in payment of the cost of the torpedo boats as provided in the subsidiary contract.

Repayment.—To be made as follows: £400,000 on December 31, 1915; and similar amounts at the end of the years 1916 and 1917.

Security.—The annual revenue, derived from the tax on the transfer of title deeds subject to a prior charge of the Poldi Huette Loan of £300,000 of March 1st, 1913, and of the loan of £2,000,000 of April 10, 1913.

Price of Bonds—£500. Bonds to be redeemed as follows:

No. 1 to 800 on December 31, 1915
No. 801 to 1600 „ „ 1916
No. 1601 to 2400 „ „ 1917

CONTRACT FOR SIX DESTROYERS

The separate subsidiary contract for six torpedo boat destroyers, in connection with the above loan, was made between the parties of the previous contract for twelve boats, and differs from it only in the following figures.

Type.—The contract stipulates that "the six Torpodo Boat Destroyers shall be of modern type and construction The length to be 260 feet; Breadth 27 feet; Draught 8.3 feet; Speed 32 knots; Number of Propellers 2; Horsepower 24,500 H.P; and Displacement 985 tons. The Destroyers shall be built by the Vulcan Shipbuilding Works in Stettin."

Armament.—The armament of each boat shall consist of two 4 inches 5 Cal. Skoda Q. F. Guns, with 200 rounds of ammunition each.

Four 12 pounds 50 Cal. Skoda Q.F. Guns, with 200 rounds of ammunition each.

Two 3 pounds Skoda Q.F. Guns, with 300 rounds of ammunition each.

Two Torpedo tubes of 21 inches with four torpedoes type Blackhead (Schwarzkopff, Berlin.)

Price.—The price of each boat shall be £145,057 (one hundred forty five thousand and fifty-seven pounds sterling) nett delivery at Swinemuente.

Delivery.—The first boat shall be delivered within 18 months after the definite settlement of this contract; one boat every two months after the first delivery; the shipbuilder not to be responsible for delays owing to strikes or other force majeure.

Payments.—Payments are to be made as follows:

£ 37,000—for each boat to be paid after the definite settlement of this contract.
£ 37,000—for each boat to be paid one week after the launching of the respective boat or boats.
£ 37,000—for each boat to be paid one week after successful trial of the respective boat or boats.
£ 37,057—for each boat to be paid when handing over the respective boat or boats to the Board

Amended Reorganisation Loan Agreement.

In the March issue of the FAR EASTERN REVIEW the proposed agreement for the Reorganisation Loan of £25,000,000 was published in full.

Since then modifications have been made, but, apart from a few alterations, the document is substantially the same.

Limitations in space prevent the re-publication of the Agreement, but to make it intelligible to those interested we will point out the important changes that have been made.

When publishing the Agreement in March the name of the Banque de l'Indo-Chine was inadvertently omitted. That Bank's name must be included in the second paragraph with the names of the other banks.

The name of the American group and all reference to American currency and interest has been omitted from the revised Agreement.

In Article I the rate of interest has been altered from five and one-half per cent. to *five per cent.* (5%), and wherever the rate is mentioned in other parts of the agreement it has likewise been altered.

In Article IV the following words in italics have been added in the second paragraph: "If at any future time the annual collection of the Maritime Customs revenues should exceed the amount necessary to provide for all existing obligations charged thereon or which may have become chargeable thereon *under existing agreements* by reason," etc.

In Article V, second paragraph, the words in italics have been added: "The engagement and

dismissal of these Chinese and Foreign District Inspectors and of the necessary *Chinese and* foreign staff," etc. . . . It will be the duty of the District Inspectors jointly to superintend the issue of licenses *and to collect all fees and salt dues*, and to report," etc.

Article IX has been altered to read: "The term of the loan shall be *forty-seven years* (47). Repayments of principal shall commence with the *eleventh* year, and shall be made by yearly sinking fund of *.983,97945%*: equal to *£245,994 17s. 3d.*, equivalent to *5,030,594.94* marks, *6,211,370.28* francs, *2,329,571.35* roubles, *2,409,765.67* yen, which shall be paid," etc.

The second paragraph of the same article now reads: "If at any time after the lapse of seventeen years from the date of the loan the Chinese Government should desire to redeem the whole outstanding amount of the loan or any part of it not yet due for repayment, in accordance with the schedule to be attached hereto, it may do so up to the end of the thirty-second year by a payment of a premium of two and one half per cent. (2½%) on the face value of the bonds, that is to say, by the payment of £102 10s. for each £100 bond, and after the end of the thirty-second year it may make such extra redemption without premium, but in each and every case of such extra redemption the Chinese Government shall give six months' previous notice in writing to the banks, and such extra redemption shall be effected by additional drawings of bonds to take place on the date of an ordinary drawing as provided for in the prospectus of the loan."

Article XIII is amended to read: "The price of this present loan or any series thereof to the Chinese Government shall be the price of its issue to the public *on the London market* less a deduction by the banks of six per cent. (6%) of the nominal value of the bonds. The issue price in London to be not less than *ninety per cent. (90%)*, securing to China a net price not less than *eighty-four per cent. (84%)* for the entire loan." In the third paragraph of the same Article the word "coupon" is deleted and "half year's interest" used in its place.

Article XVII, second paragraph, the words "December 1st, 1912," have been altered to "*April 10, 1913.*"

Article XX gives the date of the Presidential Order as the "*twenty-second day of April, 1913.*"

Article XXI says: "*Eight* sets of this Agreement are executed in English and Chinese, three sets to be retained by the Chinese and *five* by the banks."

The agreement was signed by

Chao Ping-Chun (Premier), Lu Cheng-Hsiang (Minister of Foreign Affairs), Chou Hsueh-Hsi (Minister of Finance), Mr. E G. Hillier (for the Hongkong and Shanghai Banking Corporation), Mr. H. Cordes (for the Deutsch-Asiatische Bank,) M. Henry Mazot and M. R. Saint Pierre (for the Banque de l'Indo-Chine), M. L. de Hoyer (for the Russo-Asiatic Bank), and M. Odagiri (for the Yokohama Specie Bank.)

Agreement for Advances

In our March issue we also published the Agreement for Advances which, of course, had to be altered in accordance with the changes in the main Agreement. In the preamble the name of the Chinese Premier was added to those of the Minister of Foreign Affairs and the Minister of Finance as the contracting parties on behalf of China and the American Group was dropped from the lending groups. The style of the Loan was altered to "Chinese Government Five per cent. Reorganization Loan" and the issue price in London to ninety instead of ninety-six and one-half.

Article I was altered so that of the immediate advance of two million sterling, £400,000; Marks 8,180,000; Francs 10,100,000; Roubles 3,788,000; Yen 3,918,400 were to be held to the order of the Minister of Finance in London, Berlin, Paris, St. Petersburg and Yokohama respectively. This article is otherwise unaltered.

Article II is only altered by an amendment in the style of the Loan as in the preamble.

Article III and Article IV are unaltered and Article V is dropped.

Article VI in the former Agreement for Advances becomes Article V and is amended by the deletion of the words "United States of America."

Article VII, which becomes VI, is amended by providing that eight sets of the Agreement were executed in English and Chinese, three to be retained by the Chinese Government and five by the Banks.

This Agreement was also signed on April 26, 1913, at Peking, by the following:—Chao Ping-chun (Premier), Lu Cheng-hsiang (Minister of Foreign Affairs), Chou Hsueh-hsi (Minister for Finance), Mr. E. G. Hillier (for the Hongkong and Shanghai Banking Corporation), Mr. H. Cordes (for the Deutsch-Asiatische Bank), M. Henry Mazot and P. Saint Pierre (for the Banque de l'Indo Chine), M. L. de Hoyer (for the Russo-Asiatic Bank) and M. Odagari (for the Yokohama Specie Bank).

Annexes to the Reorganisation Loan Agreement.

Attached to the Reorganisation Loan agreement are six annexes setting out the amounts needed by the Government. The loan will be disbursed according to these statements. They are as follow:—

Annex A. LIABILITIES DUE BY THE CHINESE GOVERNMENT.

Arrears of Boxer Indemnity to 31st December, 1913, estimated at about .. .. £	2,000,000
Repayment to Group Banks, with accrued interest, of sundry advances already due, as per detailed statement to be filed with Ministry of Finance, estimated at about.. .. .. £	150,000
1913	
February 28. Chinese Government Treasury Bills, under Letter of Agreement dated 29th February 1912, Shanghai Taels 2,000,000 @ 2/8⅛ and 92½ .. .. £	292,792,15.6
Together with interest @7½% per annum from 28th February, 1913, to date of payment (say)	3,200.0.0
March 9. Chinese Government Treasury Bills, under Letter of Agreement dated 9th March, 1912 Shanghai Taels 1,100,000 at 2/8 and 92½ .. £	158,558.11.6
Together with interest at 7½% per annum from 9th March, 1913, to date of payment (say)..	1,500.0.0
March 14. Belgian Loan of 14th March, 1912 .. .. £	1,000,000.0.0
Together with interest thereon from 14th March to date of payment (say)	13,000.0.0
April 6. Belgian Loan of 6th April, 1912 .. .. £	250,000.0.0
Together with interest thereon from 6th April to date of payment (say)	1,600.0.0
April 14. Advance by the American, British, German and French Groups, against the Currency Reform Loan, under agreement dated 15th April, 1911. £ 400,000.0.0	
To interest @ 6% on above advance from 30th May, 1911, to 15th October, 1912. £ 33,139.14.9	
£ 433,139.14.9	
To interest on above sum from 15th October, 1912, to 14th April, 1913, @ 6%. £ 12,887.7.10	
£	446,027.2.7
Together with interest @ 6% from 14th April to date of payment (say)	1,100.0.0
Total £	4,317,778.9.7

Annex B. PROVINCIAL LOANS.

Principal and interest in default and/or principal outstanding, plus accrued interest, as per detailed statements to be filed with the Ministry of Finance, payable to:—

(1) The nine foreign banks in Shanghai .. .. .. Taels,	3,500,000.00
(2) The Hongkong and Shanghai Banking Corporation, The Deutsch-Asiatische Bank, The Banque de l'Indo-China and the International Banking Corporation for the American Group .. .. about Tls.	2,217,804.00
(3) The Hongkong and Shanghai Banking Corporation, The Deutsch-Asiatische Bank and Banque de l'Indo-Chine.. .. .. .. about Tls.	5,882,620.00
(4) The Hongkong and Shanghai Banking Corporation .. about „	1,630,052.00
(5) The Yokohama Specie Bank, Ltd .. .. about „	5,106,940.00
(6) The Banque de l'Indo-Chine .. .. about „	122,700.00
(7) The Deutsch-Asiatische Bank .. .. about „	661,550.00
(8) The Russo-Asiatic Bank „ „	680,000.00
Total about Taels	20,138,864.00

Equal to (say) £2,870,000.

Annex C. STATEMENT OF LIABILITIES OF THE CHINESE GOVERNMENT SHORTLY MATURING:

Date Due.	
1913.	
May 17. To Chinese Government Treasury Bills under Letter of Agreement dated 17th May, 1912. Shanghai Taels 3,000,000. @ 2/9 11/16 and 92½ .. .. £	455,236.9.9
June 12. Chinese Government Treasury Bills, under Letter of Agreement dated 12th June, 1912, Shanghai Taels 3,000,000 @ 2/9¼ and 92½ .. .. £	449,324.6.6
June 18. Chinese Government Treasury Bills under Letter of Agreement dated 18th June, 1912. Shanghai Taels 3,000,000 @ 2/9¼ and 92½ .. £	452,702.14.0
Allowance for foreign claims arising out of the Revolution .. .. £	2,000,000
	£3,357,263.10.3
May 10. Loan to Chinese Minister at Tokyo, Japan, for Yen 350,000 @ 7% per annum, dated 10th November, 1911, by the Yokohama Specie Bank, Ltd., under the authorisation of the Premier and the Minister of Foreign Affairs, Ta Ching Government and was confirmed by Tsai Cheng Pu and Wai Wu Pu .. .. G. Yen	290,935.00
Together with interest @ 7% per annum from 25th November, 1912, to the date of payment, say .. G. Yen	10,000.00
Sept. 15. Loan to the Ministry of Communications for G. Yen 2,000,000 @7% p.a., dated 15th September, 1911, by the Yokohama Specie Bank, Ltd., and renewed on 15th March, 1913, under the condition to be payable out of the first proceeds of any foreign loan G. Yen	2,000,000.00

Plus interest on the above @ 7% p.a. from 15th March, 1913, to the date of payment, say .. .. .. G. Yen 24,000

G. Yen 2,324,035.00

Equal to (say) $3,592,263.10.3.

Annex D.—Disbandment of Troops.

Shantung	Taels 800,000
Shansi	500,000
Honan	600,000
Anhui	1,000,000
Hupeh	4,000,000
Kiangsu	1,500,000
Fuhkien	1,400,000
Kwangsi	1,200,000
Szechuan	2,000,000
Yunnan	1,000,000
Kueichow	600,000
Shensi	1,400,000
Mukden	600,000
Kirin	400,000
Kan-suh	1,000,000
Sinkiang	600,000
Jehol	600,000
Kwangtung	1,050,000
Chekiang	560,000
Kiangsi	60,000

Taels 20,870,000.00

The total of the above is Taels 20,870,000, which is equal to about £3,000,000.

Details of troops to be disbanded are contained in confidential statement to the Banks.

Annex E. Current Expenses of Administration. Estimated Amount from April to September, 1913.

The Board of Foreign Affairs:—

1. The expenses of the Board proper .. .. $ 381,532.00
2. Expenses for the Legations abroad 1,224,756.00
3. Expenses for the schools belonging to the Board.. .. 169,924.00

Total $ 1,776,212.00

The Board of Home Affairs:—

1. Expenses for the Board Proper .. .. $ 274,200.00
2. Expenses for constables of inside and outside of Peking city 1,223,836.00
3. Expenses for hospitals, bureaux, and schools belonging to the Board 80,011.00
4. Expenses for the Yamen of Infantry General 614,573.00

Total $ 2,192,620.00

The Board of Finance.

1. Expenses for the Board proper .. .. $ 250,000.00
2. Expenses for the Bureaux and Factories belonging to the Board.. .. .. 196,770.00
3. Expenses for President's Yamen 300,000,00
4. Expenses for the Cabinet, including the Bureau of Legislation, of Civil Appointments, of Printing, of Mongolian and Tibetan Affairs, of Audit and the Provisional Bureau of Merits 475,814.00
5. Expenses for the Parliament 1,000,000.00
6. Expenses for the Imperial Pensions 2,777,777.00
7. Expenses for the Tax Department and Schools belonging to the Board .. 103,456.00
8. Expenses for various taxation Yamen 221,800.00
9. Allowances to Bannermen and their Rice Commutation. 6,666,666.00
10. Allowances to Bannermen of the Provinces of Jehol, Tsarhar, Miyuan, etc 625,000.00
11. Allowances to those in charge of Ching Tombs. .. 404,525.00

Total $ 13,021,808.00

The Board of Army.

1. Expenses of the Board proper .. .. $ 540,000.00
2. Salaries and allowances to the various Bureaux of the various Divisions under the Board 8,400,000.00
3. General Staff and their expenses for their Camps and Bureaux 1,761,675.00
4. Allowances to Ching Guards (or to Imperial Guards) ..$ 1,243,196.00
5. Allowances to Kung Guards (Now the President's Guards) 1,532,844.00
6. Allowances to Wu Guards —Left.. .. .. 1,286,352.00
7. Allowance to Wu Guards —Van.. .. .. 974,274.00
8. Allowances and expenses for Military Executive Department in Peking 87,980.00

Total $ 15,826,321.00

The Board of Navy.

1. Expenses for the Board proper .. .. $ 182,248,00
2. Expenses for the various Commanders-in-Chief, Men-of-War, and schools belonging to the Board 1,200,000.00

Total $ 1,382,348.00

The Board of Law.

1. Expenses for the Board proper .. .. $ 346,640.00
2. Expenses for Courts and Jails 279,394.00

Total $ 626,034.00

The Board of Education.

1. Expenses for the Board proper 537,984.00
2. Expenses for Schools, Bureaux, and Offices belonging to the Board 799,620.00

Total $ 1,337,604.00

The Board of Agriculture and Forestry

1. The expenses for the Board proper .. .. $ 309,242.00
2. Expenses for Grounds and Bureaux belonging to the Board.. .. .. 42,156.00

Total $ 351,398.00

The Board of Communication.

1. Expenses of the Board proper $ 302,806.00
2. Expenses for the training purposes within its sphere .. 236,691.00

Total $ 539,497.00

Note.—Expenses for Railways, Navigation, Post and Telegraph undertakings by the Board will be included under the item of extraordinary estimates, and it may be assumed that their expenditures and incomes will balance. The newly established railway lines are not included here.

The Board of Work and Commerce.

1. Expenses of the Board proper $ 208,656.00
2. Expenses for the various Bureaux belonging to the Board.. .. .. 60,000.00

Total $ 268,656.00

Grand Total $ 37,322,498.00

Extraordinary Expenses.

1. Bureau of Printing and engraving. Engineering Works, machinery and plant $750,000.00
2. Paper Mill, Engineering works and machinery and plant 1,400,000.00
3. The Mints (Head) Engineering work, machinery and plant 500,000.00
4. The University. Building expenses 500,000.00
5. Tsung Tombs. Engineering works 4,611,537.00
6. The Parliament. Engineering works 1,500,000.00
7. Payment of Debts of various Boards in the year 1912. Administrative Expenses 3,845,000.00
8. Imperial Pensions. Due and unpaid in the year 1912.. .. 3,017,333.00
9. Rice Commutation of 8 Banners 1,807,750.00

Total $17,931,620.00

Total of Ordinary Expenditure $37,322,498.00
" of Extraordinary Expenditure 17,931,620.00

$ 55,254,118.00

Equal to (say) £5,500,000.

The representative designated by the Banks will be furnished with monthly detailed estimates of expenditure under above headings.

Annex F. Reorganisation of the Salt Administration.

General estimate for the reorganisation of Salt Administration:—

1. Capital for purchase and transportation of salt.. .. .. $7,000,000,00
2. Expenses for the establishment of Salt-making Factories with machines.. .. .. .. 3,000,000.00
3. Reorganisation of Salt lands 5,000,000.00
4. Capital for Advances to Salt merchants under a banking scheme to be approved by the Banks 5,000,000.00

$20,000,000.00

Equal to (say) £2,000,000.

Note.—In the event of the total net proceeds of the loan being insufficient to cover all the estimated expenditure under Annexes A to F any deficiency shall be met by a corresponding reduction in the amount of item No. 4 of Annex F.

[A table showing the charges on the Salt Gabelle will be found on the next page.]

THE HWAI RIVER CONSERVANCY

The espouser of the cause of the Hwai River Conservancy was Mr. Chang Chien, who, by dint of expert knowledge and indefatigable enthusiasm, carried bills legalising conservancy work through the Provincial Assemblies of Kiangsu and Anhui during the Ching Dynasty. It is one ambition of his life to adjust and control this water system and prevent it from accelerating devastating famines in the surrounding country.

After the Revolution Mr. Chang Chien was still vigorously eliciting sympathy from the foremost people in the capital and elsewhere, and at last his voice was heard, and a good start now has been made in the direction of realising the project he so strongly and insistently advocated.

The Hwai River Conservancy Bureau has now been formed, with Mr. Chang Chien at its head, and General Po Wen-wei and Shu Ting-ling, Speaker of the Kiangsu Assembly, to help him.

The Surveying Corps were in the field last year, and now the surveyors are pushing on their work with great activity. It is calculated that the survey will be complete in a measure within two months. The plan for the conservancy work will be two-fold: dredging and tilling will be carried on hand in hand. Mr. Chang Chien and his staff are now engaged in fixing the route and general system of the waterways in the region where conservancy work is to be effected. He is also proposing to establish an Agricultural Bank, which will serve as an organ to provide the funds requisite for the work.

Estimated Statement of General Charges on Salt Gabelle.

No.	Loan	Date.	Amount.	Term (years)	Security	Made by
1	Anglo-German Loan	1898	£16,000,000	45	Salt Likin, Ichang ... ... Taels 1,000,000 Do. Hupeh ... ... 500,000 Do. Anhui ... ... 300,000 Taels 1,800,000	Hk. and S. Bank and Deutsch-Asiatische Bank.
*2	Boxer Indemnity	1901	Taels 450,000,000	39	Annuity 19,899,000	
3	Loan to Hukuang Viceroy	Sept. 1907	Taels 2,000,000	10	Additional "Yao Cheng" Salt Likin Hupeh 400,000	Yoko. Sp. Bank.
4	Anglo-French Loan	1908	£5,000,000	30	Old and New additional tax on Salt in Chekiang Province ... 600,000 New Additional Tax on Salt in Kiangsu... ... ... 700,000 Old and New additional Tax on Szechuan and Huai Salt ... ... 600,000 Salt Commissioner's Treasury Province of Chihli, Revenue from additional Salt Tax... ... 200,000 New Additional Tax on Salt, Chihli ... ... 250,000 Taels 2,350,000	Hk and S. Bank and Banque de l'Indo-Chine.
5	Loan to Hukuang Viceroy	Aug. 1909	Taels 500,000	10	Second Mortgage on the Salt securities hypothecated to the Anglo-German Loan, 1898 ... 74,000	Hongkong Bank.
6	Hupei Provincial Bonds	1909	Taels 2,400,000	7	Salt Treasury, Hupei (The rest of the security is furnished from other sources) 100,000	
7	Chihli Provincial Bonds	1910	Taels 3,200,000	8	Salt Commissioner's Treasury, Chihli ... ... 350,000 Profits of Sale of Government's Salt at Yung Ping, Chihli ... 150,000 Taels 500,000	
8	Loan to Liangkiang Viceroy ...	Dec. 1910	Taels 3,000,000	6	The "Shou Hwui Fu Chia Pa Cheng" Salt Likin of the four Salt Districts of Hunan, Hupei, Kiangsi and Anhui ... 300,000 The additional Kiangnan "Yao Cheng" Salt duties ... ... 320,000 "Hai Fun Shih Wu Cheng" Salt Likin of Liang Huai ... ... 120,000 Taels 740,000	Hk. Bank, Deutsch-Asiatische Bk., Bqe de l'Indo-Chine
†9	Currency Loan	April 1911	£10,000,000	45	Newly added Surtax upon Salt of all Provinces of China 2,500,000	American Group, Hk. Bk., Deut. Asi. Bk., Bqe De l'Indo-Chine.
10	Hukuang Railways Loan	May 1911	£10,000,000 (£6,000,000 issued)	40	Hupei additional Tax ... ... 400,000 Hupei New additional Two Cash Tax of September 1908 ... ... 300,000 Hunan Salt Commissioner's Treasury Regular Salt Likin ... ... 250,000 Taels 950,000	Hongkong Bk., Deut.-Asi. Bk., Bqe de l'Indo-Chine, American Group.
11	Hupei Provincial 7% Silver Loan	Aug. 1911	Taels 2,000,000	10	Third Mortgage on Salt Securities hypothecated to Anglo-German Loan of 1898 460,000	
12	Chinese 5% Gold Loan...	Aug. 1912	£5,000,000 First issue.	40	Annual Interest ... £250,000 Amortization after 1922. 166,666 £416,666@3/...2,778,000	Crisp Syndicate.
					Gross Annual Charge on Salt Gabelle ... ... Taels 32,551,000 From which should be deducted:— Estimated available Surplus of Maritime Customs Revenue ... 10,000,000 Salt hypothecated to 1898 Loan Service of which is met entirely from Customs Revenue ... ... 1,800,000 Taels 11,800,000 Nett Estimated Annual Charge on Salt Gabelle, Haikuan Taels, ... 20,751,000	

* Note.—The charge of the Indemnity on the Salt Gabelle increases in 1916 to Taels 24,483,800, but there is a corresponding decrease of the charges of other loans on the Customs Revenue.

† Not yet issued.

CURRENCY REFORM IN CHINA

BY HSU UN-YUAN

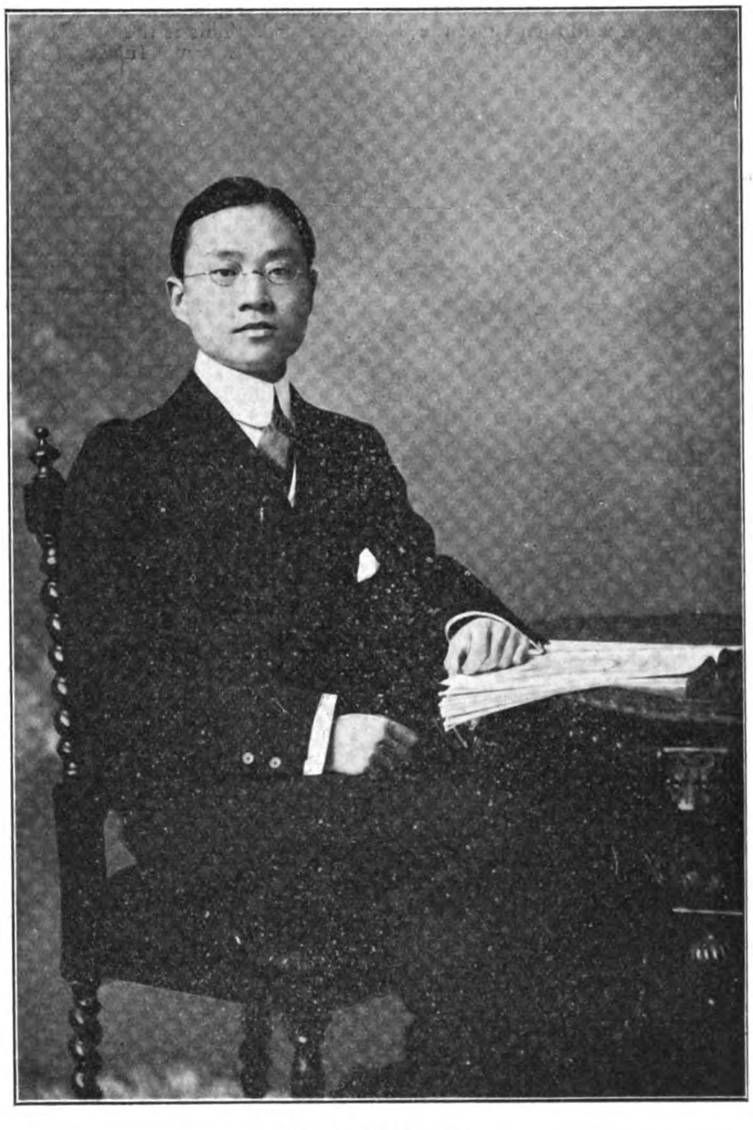
(*Translated from the Chinese text*)

A sound financial administration is the principal aim of a government and a good currency is a primary factor of a sound financial administration. If the currency system is bad, then the nation cannot compile accurate budgets, and complications will rise in business operations, which will be very detrimental to the welfare of the people.

The currency systems in China are extremely confusing, and each province, nay, each *hsien* city, has its own peculiar standards of fineness. In the commercial ports and important cities of the provinces in the South and East silver dollars are used in transactions, but in distant regions, such as the provinces in the North and West, copper coins and silver bullion are the chief medium of exchange. One great defect of such forms of currency is that their values are liable to frequent and great fluctuations, and consequently there are great inconveniences to business transactions. Thus we may say that in the currency of China there is neither a system nor a standard, and in consequence the people of China as well as foreigners are now clamouring for Currency Reform. My opinion is that the effectiveness of the reform rests upon the thoroughness with which the question is gone into. We must proceed slowly and cautiously and carefully deliberate upon all aspects. We must not draw hasty conclusions. It is a question that involves the welfare of the whole nation, and if a system be adopted that is not suitable, there will come injury instead of benefit.

When we approach this question of Currency reform, the first thing that confronts us is the question of standard. All other questions are subordinate to this question, and they can only be taken up when the standard is decided upon. What is meant by standard of a currency system? It is some commodity that has value, and that is used as the basis of a currency system. Hence, any commodity as gold, silver, copper iron, cloth, hide, etc., may be employed as a standard. Many economists of the present day think that the best standard is a combination of several commodities of daily use. We may therefore say that whatever is used as standard, it must have value in itself. Some advanced scholars of our country are now advocating the adoption of a paper standard. I strongly object to any such step. When we read history we find that in ancient times life was simple and copper and iron were used as standards. Afterwards the standard of living advanced and silver was adopted, while in modern times gold is adopted. Most of the countries have now a gold standard. Those countries that use silver are also contemplating a change to gold to secure the advantages of easy calculation in transactions. Therefore the tendency of the world is to change from Silver into Gold Standard.

But the standard of living in our country is low compared with other countries. It is only on account of international exchange that the reformers advocate the Gold Standard, and in view of the fact that it is impossible to make this jump at the present juncture, they propose to adopt the middle course, the Gold Exchange Standard. The Gold Exchange Standard is a modified Gold Standard in which the price of silver is maintained by means of exchange. In other words, in all transactions within our own country, silver dollars will be used, but the value of these silver dollars will be established at a fixed ratio with gold. It is, indeed, a good plan, but there are two difficulties that will arise when this system is put into actual operation, viz., 1. The difficulty of fixing the relative value of gold and silver, 2. The maintenance of the legal value of the silver coins. Supposing coins are to be issued and are to be given a fixed gold value. If the legal or gold value of the silver dollar always equals the intrinsic value of the silver contained in the dollar, then of course such dollars will be welcomed by the merchants, and they



Mr. Hsu Un-yuan

will be circulated without difficulty. But the price of silver frequently fluctuates. If the price of silver rises a little, then the intrinsic value of the silver of the dollar will become higher than the legal value, and, as a result, the merchants will melt the dollars or ship them into foreign countries, thus making a great deal of profit. Such cases have happened in the Philippines and Mexico. To prevent such a practice it would be necessary to fix the legal value much higher than the intrinsic value, then melting and exportation would be effectually stopped. Besides, the Government would realize a handsome profit by it. But while melting and shipping would be stopped, counterfeitng would be made more profitable. That has happened in India and other places. It would be very difficult, nay, well nigh impossible for China to prevent counterfeiting in view of the present insufficient force of police, the large area of our country, and, because the existence of extraterritoriality prevents the Chinese having authority over counterfeiters in the foreign settlements.

At the end of the year before last the silver dollar rose to as much as 78 Candareens, and forthwith a certain merchant counterfeited the dollar. When there was a profit of only four or five Candareens on the dollar, and merchants hastened to counterfeit it, how much more would they counterfeit when the profit rose to a more substantial level? It is apparent, then, that the light token coin would not be suitable in our country.

Some people suggest that since the token coin is easily counterfeited, it would be well to use paper in its place, as it is much more difficult to forge paper than to forge coins. But no matter how intricate be the process by which the note is manufactured, or however finely it may be engraved, if it can be printed by us, it can also be printed by others. Even if our own people cannot do it, foreigners may do it. For instance, recently there was a case at Hongkong of a certain foreigner counterfeiting the Kwantung Bank Notes. The defects of a note currency are more than those of token coins, and the reasons are many. I shall have something more to say on that subject at a later time. This is the difficulty of a Gold Exchange Standard in fixing the relative value of gold and silver.

But let us take it for granted that this difficulty has been overcome, and that the relative prices of gold and silver have been established. There still remains the difficulty of maintaining the legal value of silver token coins. In countries where the Gold Exchange Standard is adopted, the method of maintaining the legal value of token coins is to keep in readiness a reserve fund for exchange purposes. All those who hold token coins who desire to exchange them for gold or to buy gold drafts must be accommodated, and to do that the Government should make the exchange according to the legal value fixed by law.

The issuing of token coins by the Government is similar to the issuing of banknotes by a bank, and it is just as incumbent upon the Government to cash the token coins in gold as for the bank to cash the bank notes. The confidence of the people in the Government when using the token coins is precisely the same as the confidence exhibited when they use the bank notes of the bank. The wide circulation of bank notes depends much upon the credit of the bank. The volume of the circulation of token coins depends on the credit of the Government. The only way to get credit is to keep an adequate reserve fund for the exchanging of the token coins.

Let us calculate what would be the minimum reserve fund we would require if we were to adopt the Gold Exchange Standard. The population is 400,000,000; if two coins per capita be given, then there would be at least 800,000,000 of these silver token coins in circulation. Let us suppose that each coin be worth two shillings, then the total number of token coins would be

worth 1,600,000,000 shillings, which amounts to about £80,000,000 sterling. Put the amount of the reserve fund at one-third of this sum, and it would be about £26,000,000. This is absolutely the lowest the reserve fund should be, yet the figure is appallingly large and, considering the present financial depression of our country, it would be impossible to secure a fund to this value. But let us take it for granted that we have contrived to secure this sum, it would be certain that it could only be secured through a foreign loan. To contract a loan with big interest and heavy discounts, and then keep the proceeds of the loan locked up in the treasury, and lose interest on it would be questionable tactics. Would such a policy be justifiable? Some may suggest employing a part of it in circulation, or invest part of it in investments in some profitable enterprise, or in buying short-term drafts and easily sold foreign bonds, but all this would require astute business operations to insure success and guard against failure, which can only be accomplished after years of experience.

Some may argue that the token coins would be in active circulation on the market, and since they would be absolutely necessary in daily transactions, the people would not be likely to exchange them for gold, and the only instance where it would be necessary would be for the repayment of foreign debts, and the Government therefore would only need to keep a certain amount to supply this demand, by depositing the reserve fund in some foreign markets. But when the Government had fixed the relative prices of gold and silver, how would it be possible for it to prevent people from exchanging the coins for gold? If the token coins could not be exchanged for gold, then the system would be similar to inconvertible paper currency.

Even should there arise no necessity for exchanging the token coins in the country, and the country had only to consider the exchange of money abroad, a very big sum would be required as a reserve fund in foreign countries in order to prevent a failure. In 1908 there was a famine in India, and the amount of exports fell greatly. The gold funds remitted to foreign countries were enormous, so much so that the reserve funds were about to be exhausted. The failure of the Gold Exchange Standard was imminent, and it was only due to the timely action of the British Government in rendering assistance that the financial situation of India was saved. Now, we cannot predict with any degree of certainty the imports and exports of our country each year, and the financial strength of our Government is far behind that of Great Britain, and if there should ensue a panic when the Gold Exchange Standard is adopted who is going to give relief?

There are a great many difficulties and dangers confronting the adoption of the Gold Exchange Standard, and it would not be advisable to adopt it.

Therefore I advocate that we begin the Currency Reform with modest aspirations. Let us first of all unify the Currency system. For the present, let us adopt the Silver Standard. Wait until the unification of currency is effected and the Treasury is adequately replenished, and then enact the Gold Standard. This is the only safe procedure in Currency Reform. In the meantime we should aim at the ultimate adoption of a Gold Standard and do all we can to make preparations to effect this object. We must proceed gradually.

In reviewing the history of currency reform in various nations I invariably find that catastrophe and failure were more liable to attend Currency Reform than success, and it often happens that when a scheme is enacted after a hasty decision, the economic conditions of the whole country are injured. Our country is just undergoing a severe process of disorganization, and the mind of the mass of the people is not in a reposeful state. The credit of the Government is not quite firm in the eyes of the people. When a change is to be effected, it is true we shall pursue the most up-to-date methods, yet it is also important that the general customs and conditions of the country be considered carefully. Mere theory or adoption of methods without discrimination would be worse than useless; either would produce disastrous results.

The contentions of the advocates of a Gold Exchange Standard are that when gold rises in value, there is a heavy drop in the price of silver, and China suffers great losses on repayment of foreign loans and indemnities. But the fluctuation of silver is frequent, and as there are falls in value, there are also rises. There are many reasons why we suffer losses in exchange, the chief one being that the exchange organs are insufficient and are mostly in the hands of foreigners. When we repay indemnities and loans, a sudden demand for foreign quotation is created and the foreign bankers are apt to raise their quotations to corner more profits. Now the Exchange Bank of our country is going to be established and the competition will have some tendency to equalize or control the exchange, we will even if the silver price falls, incur far less losses than heretofore.

In my opinion we need not concern ourselves about the fluctuations of silver. When we adopt the Silver Standard we may adopt some insurance scheme by which to equalize the exchange fluctuations. The details of this scheme I shall explain later on.

I recollect that in 1909 I wrote a paper for the Royal Economic Society of Great Britain on the Chinese Currency Reform, and, at that time I was an enthusiastic advocate of the Gold Exchange Standard. When I returned to China I made careful researches Whenever I went through an important port, I interviewed the leading merchants and bankers and discussed this subject with them. After much study and investigation I came to realize that the Gold Standard and the Gold Exchange Standard were impracticable and changed my former views. I now conclude that in effecting this much-needed currency reform our country, we should first adopt the Silver Standard and have a uniform system of coinage. We must not endanger our financial stability by a desperate jump to high ideals and fine theories and adopt the Gold Exchange Standard.

PUBLICATIONS

"The Gasoline Engine on the Farm." By Xeno W. Putnam. About 550 pp. With 179 special engravings. The Norman W. Henley Publishing Co., 132 Nassau St., New York.

The conditions under which farm work was performed remained unaltered for centuries, and it was not until comparatively recently that the labour-saving devices which were revolutionising other industries were directed to work on the farm. From its very character it was more difficult to apply mechanical aids in this direction than towards manufacturing, where the work is concentrated and the requirements for power and so forth are practically unchanging. For farm work mechanical aids have to fulfil many special conditions and little real progress was made until the development of the gasoline engine was seriously taken in hand.

In the volume under review Mr. Xeno W. Putnam has made available a mass of most useful and interesting information in regard to gasoline engines in their relation to farm work. A notable feature of the book is the absence of technical language, and the result is that even those without technical knowledge can, with its aid, become thoroughly familiar with the operation and care of gasoline engines, tractors and auxiliary devices. The scope of the work is thoroughly comprehensive and the reader is gradually given an adequate knowledge of the principle of the gasoline engine and the functions of the different parts. Chapters are devoted to such matters as Setting the Engine, The Fuel Supply, Lubrication, Elimination of Engine Troubles, Selecting and Operating the Engine, The Traction Engine, Power Transmission, etc, etc.

To everyone interested in the operation of gasoline engines this handsomely got up volume will prove indispensable. Its value is greatly enhanced by the numerous figures and engravings. This excellent handbook is priced at G. $2.50, and we have no hesitation in saying that it is well worth the money.

PHOSPHATES IN PRATAS ISLANDS

The Pratas group of islands, almost 170 miles from Hongkong, and about 420 miles from Manila, has long been recognised as a fine position for a wireless station in the China Seas and it appears that the Chinese Government has accorded recognition to the requests made for the erection of a wireless installation there, the benefits of which, and especially to Hongkong, cannot be overestimated in connection with warnings of the approach of typhoon weather. The islands are known to be rich in phosphates, having been the home and shelter probably for centuries of myriads of sea birds. The islands are not without interest to Singapore, as it is known that Mr. Tan Boo Liat is the holder of a concession of the islands from the Canton Government. Under the advice of well known merchants he has been judiciously concentrating his efforts on obtaining valuable information regarding the phosphate deposits, with considerable advantage to himself and the group of friends associated with him

The Tong Sah Ton, Limited (Pratas Island Phosphates Exploitation Syndicate, Ltd.) has been formed with a capital of $120,000 thoroughly to exploit the islands, and a genuine exhibition of faith in the venture has been demonstrated in a marked manner, as the whole of the issued capital was very largely oversubscribed privately in a few hours, and there is no issue to the public of shares. The islands, from an authentic source, are reputed to contain phosphate deposits of proved high quality sufficient to work for a period of 40 years on a monthly output of 2,000 tons. There are extensive buildings, light railway lines and pier already built, the use of which has been obtained from the Canton Government for practically a song. The board is entirely Chinese and comprises gentlemen well-known and influential. The capital backing behind the syndicate is reported to run to large figures.

RUSSO-MONGOLIAN MINING AGREEMENT

The Mukden Tutuh has received a report from a detective stating that the Urga Government has concluded an Agreement with Russia concerning the mining rights in Mongolia, the substance of the Agreement being as follows:—

1. In accordance with the stipulations contained in the Urga Protocol, the Urga Government grants the Russians the right to develop the mines in Mongolia.

2 The Head office of the Mining Company shall be at Sainnojon.

3. The capital is to be provided by the Russians, and the Urga Government may provide one-fifth of the whole.

4. Russian subjects may, on the introduction of the Mining Company, apply for Mining Licenses.

5. 1% tax shall be levied on mineral products which shall go to the Urga Government for military purposes.

The motor-cars ordered from England for the Japanese Imperial Household arrived in Tokyo, and were put together by the mechanics attached to the Palace. His Majesty the Emperor intends driving out in the cars.

THE ELECTRICAL INDUSTRY IN JAPAN

Views of a German Expert

We find in the *Electrical Review* an interesting article, translated from the *Elektrotechnische Zeitschrift* on the electrical industry in Japan. The writer, Mr. Ludwig W. Schmidt, points out that the great expansion of the electric motor in Japan is not only due to the advantages of electrical energy as a distributor of power in factories, but also largely to the surprisingly rapid development of Japanese industries, which has succeeded in trebling the number of factories in the past decade; and the predominance of this form of power now seems assured for factory working. In order to prevent misapprehension, however, Mr. Schmidt should have pointed out that very many of these factories are very small concerns indeed. He goes on to say that where electric tramways or central stations exist the energy for the driving of the motors is usually supplied from stations, this being of special advantage in the towns, where the lighting and tramway load permits of a fairly cheap supply being afforded to the users of power. In many cases, however, the factory owners have installed their own generating plant, especially in the textile industry, the shipyards, metal refining works, and the mines. This fact is explained, in the instance of the mines, by the great distance which separates most of them from the real centres of industry, and the metal refineries have been compelled to establish individual plant mostly for the same reason.

The development in the use of electric power has been accompanied by the simultaneous extension of electric lighting. From the beginning of 1900 to 1910 the number of lighting companies has risen from 49 to 122; the buildings electrically lighted have increased from 47,701 in 1901 to over 600,000 in 1910; and the number of private lamps in use has advanced from 300,000 to 1,900,000, whilst the street lighting lamps have grown from 6,400 to 59,300 in the same period of years. Many of the lighting companies are also owners of tramways, and their total net receipts have increased nine-fold in the 10 years ended with 1910. Not only so, but the ratio of net profits to expenditure has constantly improved. It formerly stood at 3 to 1, but at present almost 50 per cent. of the total profits represents net profits. The electric tramways have found a specially favoured sphere of activity. As in almost all new industrial countries, so in Japan have the manufacturers begun to locate themselves as near to the coast as possible, and in this way a number of densely-populated industrial centres has arisen, where the transport of the workers to and from their place of employment has become a similar problem to that in New York, Berlin, and London. During the 10 years the number of towns provided with electric tramways has advanced from 11 to 40, the length of line from 72 to 692 miles, and the passengers from 46,477,000 in 1901 to 395,666,000 in 1911, and the invested capital from £1,500,000 to £18,700,000.

The Position of Japanese Manufacturing Firms

The development in all branches of the consumption of electricity, proceeds the writer, has naturally had a favourable influence on the sale of electrical manufactures, and the electrical trade of Japan for this reason has made a large advance since the beginning of the century. Until nearly the end of the past century, by far the greatest part of the turnover was effected by the importers; but during the decade under consideration, the situation has become more favourable for the native manufacturing works. The history of the domestic industry is full of reactions and of successes only obtained after great trouble, and even in the present century the progress made by the native works has frequently been accompanied by failures. In particular it has turned out that many of the large works were equipped with inadequate capital, and this had led to financial losses in many cases, as it was impossible to bring the works quickly enough to the capacity for which they were designed. Various works which were projected with foreign capital either had to be abandoned before they were actually established, or they could only be successfully carried out after great difficulties had been overcome. Nevertheless, the industry has managed to reach a sound basis to some extent in the course of years, and it can now be regarded as having attained an assured position, although many works have not yet quite fully surmounted their juvenile defects.

The local demand has been greater than the capacity in many cases, and extensions had to be undertaken without sufficient capital being available. But the greatest want has been the lack of good and trained workers. It is true that the Japanese dispatched engineers to Germany, England, and the United States in order to study the latest methods. As a result of the knowledge thereby gained no money has been spared in introducing the newest types of machinery, but the Japanese have been unable to impart the theoretical knowledge to their workmen. This difficulty has been specially noticed in the cable works, of which a number have arisen in recent years. In general, the cable factories work under tolerably favourable conditions, as they are usually in close relations with a large copper mine from which raw material is obtained at the lowest prices, and they are also protected by a high import duty. Nevertheless, they are not able to shake off foreign competition because the quality of the imported cables is generally better than that of the native product. The reason for this occurrence, according to a British Consular report, lies in the lack of sufficiently trained chemists in regard to rubber. Certain of the owner of cable factories have therefore adopted the course of obtaining the services of qualified foreign workers, but the latter are hampered by the fact that they are unable to make themselves sufficiently understood by the Japanese workers. While the imports of telegraph cables are, as will be seen, irregular, the imports of insulated wires show a constant advance, and the requirements have increased tenfold since the beginning of the century. The accompanying table illustrates the general course of the import trade during the past 14 years:—

Imports of Electrical Machinery, Cables, and Insulated Wires

		Machinery.	*Telegraph cables.*	*Insulated wires.*
1898	..	£69,700	£18,500	£32,100
1899	..	45,000	19,400	14,500
1900	..	97,600	104,900	38,100
1901	..	97,900	49,800	42,900
1902	..	132,300	8,500	67,400
1903	..	111,400	33,200	33,900
1904	..	165,200	103,700	75,000
1905	..	301,500	256,900	78,700
1906	..	181,100	20,800	95,700
1907	..	254,300	133,300	112,900
1908	..	372,100	42,000	144,700
1909	..	300,000	35,900	151,700
1910	..	219,200	159,500	163,700
1911	..	571,100	37,700	370,000

The manufacture of lamps and similar articles has largely increased. But although the domestic industry is at an advantage in relation to foreign competition through the import duties, the imports have not experienced any decline, and the business undertaken by Germany in this direction has been doubled in the past three years. Several of the large electricity companies have adopted the policy of importing certain parts from Europe or the United States and assembling them in Japan. This practice probably explains the fluctuations in certain articles of import in recent years. In conclusion, the author gives the following tables showing the respective exports to Japan of Germany, Great Britain, and the United States in recent years:—

German Electrical Exports to Japan.

	1908.	1909.	1910.
Dynamos	£67,600	£58,550	£56,400
Armatures	7,150	1,650	4,800
Accumulators	2,400	2,400	20,300
Cables	94,150	28,500	163,950
Arclamps	600	400	600
Searchlights	250	1,150	10,550
Glow lamps	10,800	10,650	25,600
Telegraph apparatus	3,500	600	3,400
Apparatus for power transmission	37,300	20,500	21,850
Apparatus for medical purposes	2 400	3,900	2,750
Measuring apparatus	5,850	14,550	21,300
Primary batteries	200	50	100
Heating apparatus, &c	400	150	—
Insulating materials	—	—	50
Total	£232,600	£143,050	£331,650

British Electrical Exports to Japan

	1908.	1909.	1910.	1911.
Rubber-insulated wires	£32.310	£25,550	£48,210	£19,120
Other insulated wires	28,895	53,615	39,690	49,965
Telegraph and telephone wire.	41,050	64 515	252,205	100,500
Telegraph and telephone apparatus	4,050	3,030	3,245	1,800
Carbons..	Not separately recorded			
Lamps	Not separately recorded			
Batteries	5,650	7,495	7,165	4,460
Unenumerated ...	12,565	18,155	24,090	24,145
Total	£124.520	£172,360	£374,605	£199,990

United States Electrical Exports to Japan

	1908.	1909.	1910.	1911.
Electrical apparatus, including telegraph and telephone materials...	£88,960	£60,985	£67,780	£181,610
Machines	299,220	235,040	142,960	261,425
Total	£388,180	£296,025	£210.740	£443,035

UNIFICATION OF RAILWAY ACCOUNTS

In connection with the unification of railway accounts, described in an article in the Far Eastern Review last month, and written by Dr. C. C. Wang, it is interesting to note that Dr. Wang has gone to Europe in company with Mr. Tsang Kuang-hsiang, Inspector General of Railways, to study the various systems of accounting in vogue in various countries. They will be away for a few months, and their investigations should lead to great benefits to China in future. Dr. Wang has his heart and soul in this work, and his mission abroad is not likely to be as resultless as many other missions which China has from time to time sent abroad. Dr. Wang has gone to learn something, and to put into practice what he has learned when he returns.

SINO-JAPANESE COMMERCIAL TRUST CO.

A Reuter telegram from Tokyo dated May 22 was as follows:—The prospectus of the Sino-Japanese Commercial Trust Company has been issued. The capital of the Company is Y. 5,000,000, half to be subscribed by Japanese and half by Chinese, and its object is to capitalize railways and mines and act as agents for Japanese capitalists and Chinese merchants.

The shareholders include the Mitsui Bussan Company, the Mitsu Bishi Company, the Industrial Bank of Japan, the Yasuda Bank, the Yokohoma Specie Bank, Bank of Formosa, Fifteenth Bank, Hundredth Bank, and Messrs. K. Okura & Co. The head office of the Company will be in Shanghai, and the chief branch in Tokyo.

It is stated that all business people connected with the Kuomintang are joining the Company and it is anticipated that Dr. Sun Yat-sen and Baron Shibusawa will be its Presidents.

FAR EASTERN RAILWAYS

CHINA

Projected Line in Kwangtung:—For some time there have been discussions as to the necessity of joining the populous town of Tsang Shing on the East River with the main line between Canton and Kowloon. It will attach itself to the main line at Shek Lung. It will not be a long line, only about forty li, or say fourteen miles. On the other hand it will pass through two or three biggish towns. The cost of building the line is estimated at about four hundred thousand dollars. The promoters affirm that the way is level and that land can be purchased cheaply. The same Company have also suggested others, joining the towns in the district north of the East River. About three hundred thousand dollars have already been subscribed. The future of this branch line may, therefore, be assumed to be secure.

Kirin-Changchun Railway:—The traffic-returns of the Kirin-Changchun Railway for the first three months of this year, according to the report received by the Mukden government, are as follow:—

Receipts.	Jan.	Feb.	Mar.
Passenger	35,612	22,107	34,750
Goods	30,950	17,689	23,598
Goods (by monthly contract)	6,331	1,878	6,294
Sundry	160	325	1,219
Total	73,053	41,999	65,861

The Ministry of Communications has received a despatch from the Kirin-Changchun Railway authorities urging the prolongation of the line to the bank of the Sungari River. It says in part that the line as it now stands is only 200 li and the biggest towns on the line are Kirin and Changchun, which, although they are trading marts, yet do not possess the qualities of such extensive development as is possible with a port accessible both by land and water routes. If the railway is prolonged to the bank of the Sungari River then the railway will be connected with the water route and there will be great developments possible because of the increased facilities. Moreover, the extension will be only about fifty li, and, as there are no engineering difficulties $1,000,000 will be sufficient. After completion the receipts of the line will be materially increased. The Minister of Communications has approved this proposal and sanctioned the use of the receipts of the railway as construction funds.

Proposed Changsan-Yusan Railway.—The proposal of T'ang Shou-hsien, Managing Director of the Chekiang Railway, to construct the short line connecting Changsan, in Chekiang, and Yusan, in Kiangsi, has received enthusiastic response, and some definite action has been taken toward the carrying out of the project. This line, short though it is, will be a connecting link, greatly needed, between the grand routes of the two provinces to Anhui and northward on the one hand, and to Fukien and Kwangtung on the other hand.

T'ang Shou-hsien, about a month ago, proceeded to Nanchang to confer with Tutuh Li about this project. While there, he and the Kiangsi authorities drew up an agreement, with plans and estimates for the construction of the line. These were sent to the Kiangsi Provincial Assembly to be deliberated upon. The Assembly was very favorable to the project and replied that of the $1,400,000 necessary for the line, the provincial Governments of Kiangsi and Chekiang would make an advance of $400,000, and, as for the rest, Kiangsi should undertake to subscribe $500,000 and Chekiang another $500,000. The Assembly also remarked in the reply that since this line was short, and construction cost would be comparatively low, it could be built in a short time, and as it was situated in a very good position, they thought the railway would surely prove to be a profitable investment. They requested the Tutuh to send a commissioner to Hangchow to confer with Mr. T'ang Shou-hsien in order to expedite matters. Tutuh Li therefore sent Mr. Hu Yi, ex-Chief of the Communications Bureau of Kiangsi, to Hangchow.

Yusan is in the prefecture of Kwangsin-fu. A merchant from the Kwangsin-fu city has volunteered to raise subscriptions to the amount of $500,000, and has received the approval of the Tutuh.

Canton-Hankow Railway.—The Associate Director of the Canton-Hankow and Hankow-Szechuan Railways, Dr. Jeme Tien-yew, arrived at Hankow early in May to arrange for the commencement of construction work. He stated that money was available in the Hongkong & Shanghai Bank for the construction of the British section, and that he expected work to begin immediately. He stated further that the Administration had now appointed the following Accountants:—

For the British section (Wuchang to Yichang, on the Hunan-Kwangtung border) Mr. C. C. Connell, late of the Shanghai-Nanking railway.

For the German section (Hankow or Kwangshui to Ichang) Mr. Schidt.

For the American section (beyond Ichang) Mr. Plant.

In addition the appointment of Mr. Cyril H. Bell, A.C.A., as auditor of the British section, had been confirmed.

The first work to be undertaken, will be to complete the purchase of the land, then to make the earthwork. The only material that has been ordered up to the present is the telegraphic material.

Yencheng-Chowkiakow Branch Line.—Chowkiakow is one of the most famous marts in Central China, and in the past it has been the sole distributing centre of Honan and adjoining Provinces. It possesses the peculiar advantage of situation, as it is accessible by the Hwa River, and merchandise from Kiangsu and Anhui may be shipped by the waterway up to Chowkiakow. It has played an important part in the commercial history of Honan, but since the advent of the iron road, what was formerly regarded as a lively port has been relegated to the background.

Nevertheless, its merits so far as waterway transportation is concerned are entitled to serious consideration. The Chowkiakow Chamber of Commerce have awakened to the fact that they are losing their former prestige and they must do something if they do not want their town to be looked upon as of no consequence. The best solution is to effect a junction with the Kin-Han Railaway, which will not only restore its former prosperity but will materially increase its importance, as the bulk of goods bound for the Eastern Provinces will be diverted into its direction instead of going by the circuitous route via the Yangtse River. A petition has been forwarded to the Board of Communications by the local Chamber of Commerce.

It may be said here that several years ago, when the Kin-Han Railway was in process of construction, the engineer in charge of the Honan section had proposed the building of a branch line from Yencheng to Chowkiakow, the distance being about 120 li, but somehow the matter was dropped. The Board of Communications now realises the importance of this branch line, and has already sent three engineers of the Kin-Han Railway to make a preliminary survey of the line.

Chinchowfu-Taonan-fu Railway.—At the instance of the Mongolia-Tibet Communications Company, the Ministry of Communications has appointed Mr. Chen Tz-min, Civil Engineer, graduated from America, to take charge of the surveying work of the projected Chinchow-fu-Taonan-fu Railway. He has reached Mukden, and after conferring with Chen Chao-sing, Director of the Communications Company, set out for his survey, being accompanied by several assistants.

Shantung Railway Dividend:—The dividend of the Shantung Railway will be 7½ per cent. for the last year; the advance from 6 to 7½ per cent. is a consequence of the rise of the silver price.

The Lotung Railway.—The Tutuh of Honan, Mr. Chang Tseng-fong has reported to the Government that the shareholders of the Lotung Railway are willing to have their line constructed together with the Hailan Railway. The Government has referred the matter to the Ministry of Communications for decision. Another report says that the shareholders are not willing to hand over the line to the Government.

Mongolia and Tibet Communications Co.—The Mongolia and Tibet Communications Company, which was formed with the object of developing means of communication to thereby foster industrial and commercial activities, has established branches at important cities on the Chinese frontier. The Head Office is in Peking. Recently the Head Office received a letter from its Mukden Branch setting forth the proposal to build a light railway from Kinchow to Taoman. The Head Office has given its approval of the project, and they are now taking steps to carry it out.

Fang-chang Railway.—A merchant by the name of Zie Min has petitioned the Ministry of Communications for permission to build a railway from Chowkotien, of Fangsan, to Changkowo. He stated that he had raised the necessary funds, and asked that the Ministry send an official to make investigations.

The Szechuan Railway.—The Ministry of Communications have issued an order commissioning Mr. Feng Chu-pei to proceed to Ichang to arrange for the taking over of the Szechuan Railway.

Bridge Contract.— The Shan-hai-kwan Bridge Works (belonging to the Peking-Mukden Railway) was recently given the contract for building the superstructure of the bridge to cross the river at Tatung-fu, on the extension of the Railway line from Kalgan. The contractors are to build 20 spans of 100 feet each, the price per span being £512. The first four spans are to be delivered in August and the remainder at four spans per month. The spans will be standard, and may go in one bridge or another.

Railway Officials.—When the Pienlo Railway was amalgamated with the Hailan Trunk Line, it was placed under the control of Mr. S. C. Sze, the Director-General of the Line. The Managing-Director of the Pienlo Railway has now been transferred to become the Director on the Kin-han Railway. It is proposed that Mr Lu Hsueh-meng be appointed the Managing-Director of the Pienlo Railway.

The Chefoo-Weihsien Railway.—The Surveying Corps have finished the surveying of the line from Chefoo to Weihsien, a distance of 200 miles. The estimate made by the Ministry of Communications of the cost of construction is Tls. 70,000 per mile, and the whole line will require about Tls. 15,000,000. Minister Chu decided upon two methods of raising the funds:—(1) to subscribe the capital among the merchants, (2) to float a foreign loan to meet any insufficiency.

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended April 19 are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	52,005	11,977	63,982
1912....	52,715	6,448	59,163
Increase.	—	5,529	4,819
Decrease	710	—	—

For fifteen weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913....	777,860	151,844	929,650
1912....	774,964	78,700	853,664
Increase.	2,842	73,144	75,986
Decrease	—	—	—

Week ended April 26:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	43,716	10,119	53,875
1912....	46,959	7,066	54,025
Increase.	—	3,053	—
Decrease	3,243	—	190

For sixteen weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1913....	821,522	161,963	983,485
1912....	821,923	85,766	907,689
Increase	—	76,197	75,796
Decrease	401	—	—

Week ended May 3:—

For the week.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	44,446	10,359	54,805
1912....	46,091	6,262	52,353
Increase.	—	4,097	2,452
Decrease	1,645	—	—

For seventeen weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	865,068	172,322	1,038,290
1912....	868,014	92,028	960,042
Increase.	—	80,294	78,248
Decrease	2,046	—	—

Week ended May 10:—

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	52,626	9,302	61,928
1912....	47,444	6,751	54,195
Increase.	5,182	2,551	7,733
Decrease	—	—	—

For eighteen weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	918,594	181,624	1,100,218
1912....	915,458	98,779	1,014,237
Increase.	3,136	82,845	85,981
Decrease	—	—	—

JAPAN

Wakayama Light Railway.—The Japanese Railway Board gave a charter on April 1 to the Santo Light Railway Company, promoted by Mr. Taro Kakiuchi and eleven others. The light railway will connect Nakanoshima, with Nishi Santo village, Wakayamaken, extending six miles with a gauge of 3 feet and 6 inches. The capital of the company is 250,000 yen.

Motor Cars for Railway Use.—The Japanese railway authorities have started, it is said, an investigation with a view to employing electric locomotives and motor cars in some sections of State railway lines, in order to increase the carrying capacity of trains and to save expenditure.

Keiwo Electric Railway.—The newly constructed line of the Keiwo (Tokyo-Hachiwoji) Electric Railway Co. has been opened to business.

Narita Railway.—The Narita Railway Company held its semi-annual general meeting, recently, at which a dividend of 6.5 per cent. was declared for the latter half of the year 1912-13.

The Fuchoku Railway.—The last section of the Fuchoku Railway, Japan, was opened on April 1. This line runs northwards along the Japan Sea coast from Toyama, the northern terminus of the Hokuroku line, to Naoyetsu, near Niigata, connecting with the Hokuyetsu and Shin-Yetsu lines. Construction was started from both ends in March, 1907, and the section between Toyama and Uwotsu (17 miles) was completed in November, 1908; the section between Uwotsu and Tomari (14.7 miles) in April, 1910; the section between Naoyetsu and Nadate (9 miles) in July, 1911; the section between Tomari and Aomi (14 miles), and the section between Nadate and Itoigawa (16 miles) in December last; and the section between Aomi and Itoigawa (4 miles) has just been completed. The total length of the Fuchoku line is just over 76 miles, on which 21 tunnels have been cut, 150 river bridges and 35 minor bridges have been constructed, and there are twenty stations. The total cost of the line amounted to about Y.12,707,020. The Koshirazu tunnel, the largest on this line, is 4,956 feet long and the bridge across the Kurobe river, the longest on the line, is 2,468 feet. The opening of the service on the whole line of the Fuchogu Railway will largely revolutionise traffic between Echigo and neighborhood and Tokyo and Osaka. By the opening of this service the distance by rail between Niigata and Osaka has been shortened by 24 miles, and the distance between Tokyo and Toyama by 180 miles. The direct service also saves a great deal of time on the journey between Osaka and Niigata and between Tokyo and Toyama.

Osaka Harbor Railway Connection.—During the second Katsura Ministry the Japanese Government planned a rail connection between Osaka harbor and the trunk line, but owing to a divergence of views between the Communications Department and the Army the matter was shelved. Lately the question has been revived, a new committee being appointed by the Osaka Municipal authorities to consider measures for utilising the Osaka harbor works for commercial purposes. Two harbor lines are proposed—one from Umeda, known as the northern line, and the other from Namba, known as the southern line, and the Osaka Harbor Committee has been appointed to investigate and report upon the merits of the two lines. Baron Goto, Minister of Communications in the Katsura Cabinet, preferred the southern line and the Military authorities the northern line. The Committee just appointed favor the northern line, and will address a memorial to the Government to this effect. This movement is backed by Colonel Shiki, Chief of the Staff of the Osaka Army Division, and is regarded favorably by the Osaka Chamber of Commerce. It is believed that the construction of the line will soon be undertaken.

Railway Expenditure in 1912-13.—The estimate of expenditure for the construction of repairing work of Japan State railways for the fiscal year 1912-13 was 68,997,964 yen in all, of which 47,671,104 yen was really spent and the rest about 14,000,000 yen is to be carried forward to the current fiscal year 1913-14.

Hanshin Electric Railways May Increase.—It is reported that the Hanshin (Osaka-Kobe) Railway Company intends to increase its capital to 14,000,000 yen or double the present amount, for the completion of the proposed lines and some improvement works.

The company held a general meeting of its shareholders recently and declared a dividend of 13 per cent. for the latter half of the fiscal year 1912-13.

Railway Retrenchment in Japan.—Mr. Tokonami, President of the Japanese Imperial Railway Board, is busily engaged in the preparation for the proposed reform in the railway circles. The *Asahi* is informed by members of the staff engaged in these preparations, that several sections of the Board and of local Bureaus will be abolished or amalgamated with others, and the number of the officials may be reduced by 30 or 40 per cent. in the Board (Head Office) and by 10 or 15 per cent. in the local Bureaus (Branch Offices). In the Head Office, there are 16 officials of *Chokunin* rank, 120 of *Sonin* rank and 1,569 of *Hannin* rank and below, the total amount of their salaries being Y.711,298 a year. In the five local Bureaus, there are 5 officials of *Chokunin*, 342 of *Sonin*, and 5,970 of *Hannin* rank (officials below the *Hannin* will not be reduced), the total amount of their salaries being Y.3,762,456 a year. If, therefore, the officials in the Head Office are reduced 35 per cent., 594 will be dismissed, saving Y.248,954 in salaries. If local Bureau officials should be dismissed by 12 per cent., 758 will be relieved of their duties, saving Y.452,000 in salaries; or a total dismissal of 1,352, and an annual economy of over Y.700,000. In the event of this decrease being carried into effect, travelling expenses and other items will also be economised, the total retrenchment being estimated at Y1,000,000.

Underground Railway in Tokyo.—A proposal was made some time ago in the Tokyo Municipal Assembly for construction of two underground railways, one running between Iida-machi in Kojimachi-ku and Mejiro in Koishikawa-ku, under the control of the Johoku Electric Railway Company, with a capital of 3,500,000 *yen*, and the other leading from Takanawa Minami-cho, Shiba-ku, to Chayacho, Asakusa-ku, *via* Ginza, Sudacho and Ueno, under the control of the Tokyo Underground Railway Company, with a capital of 15,000,000 yen. The Special Committee appointed by the Municipal Council for the investigation of the project met in conference recently at the Municipal Hall in order to conclude the discussion. After exchanging views and discussing the results of their investigatons, they came to an agreement that although the project is to be approved in principle, it must be rejected for the present, as it would interfere with the unification of the municipal organs of communication.

Narita Railway Company.—At a general meeting of the Narita Railway Company a dividend of 6.5 per cent. was declared and the following accounts were passed:—

	Yen.
Net Profits	106,509.336
Brought over from Last Account...	4,808.918
Total	111,318.254

This amount was appropriated as follows:—

Legal Reserve	6,200.000
Special Reserve	10,650.000
Bonus	9,500.000
Dividends	78,812.500
Carried forward	6,155.754

Japanese State Lines.—According to investigations made by the Railway Bureau, which have been nearly completed, the total length of the Government and private railways in Japan now open to traffic is 5,937 miles. The projected railways will add 5,018 miles. In addition to these, there are certain other

projected railways (branch lines for the most part), which will have a total mileage of 6,118.

In the course of a few years, therefore, Japan will have over 17,000 miles of railway within her borders. Some of the proposed lines it will be necessary to build. If built as light railways, they will consume a capital of Y.603,565,174.

If as ordinary railways at least Y.652,135,174 will be required. The balance of the proposed lines is likely to cost Y591,636,758.

MANCHURIA

South Manchuria Railway.—The aggregate traffic receipts of the S. M. Railway for the fiscal year 1912, ended last March, reached Y.19,825,919, which is an increase by Y.2,298,832 over the preceding year.

The *Manchuria Daily News* hears that the South Manchuria Railway Co. has set aside for the current fiscal year about Y.2,310,000 for maintenance of way and about Y.2,000,000 for construction, improvements, etc., of the lines. This appropriation includes the purchase money for machinery and other materials, which is said to take up about four-sevenths. Three-fifths of the remainder has already been awarded to contractors by tender, leaving the remaining two-fifths still open for tender.

The statement of profit and loss for the fiscal year 1912 to be presented to shareholders at the annual meeting in Tokio on June 14, contains the following:—

Railway	19,907,000	7,846,000
Steamer	535,000	558,000
Mining	9,193,000	7,347,000
Harbour	1,688,000	1,489,000
Land	633,000	1,401,000
Hotels	234,000	271,000
Electricity	849,000	577,000
Gas	172,000	93,000
Sundry receipts	65,000	—
Interest	264,000	—
General management expenditure	—	2,050,000
Sundry losses	—	1,070,000
Interest on debentures..	—	5,564,000
Writing off discount on debenture issue	—	340,000
Total	33,540,000	28,606,000

The net profit for the fiscal year amounts to Y. 4,934,000.

Compared with the preceding fiscal year 1911, divided into the tenth and the eleventh working half-years, the increase in the net profit amounts to about Y. 1,267,000.

The total receipts and expenditures with the net profit for the fiscal year 1911 were as follow—

Total receipts	Y.28,155,180
Total expenditures	24,487,653
Net profit	3,667,527

Penchihu-Kanchang Light Rail Line.—The proposed construction of a light rail line, 60 miles long, between Penchihu and Chenchang has been passed by the Fengtien Provincial Assembly.

Antung-Mukden Railway.—A report states that since the Antung-Mukden Line was opened to traffic, the business end of the railway is showing a far better result than was anticipated by the South Manchuria Railway authorities. True, the traffic is run still under some losses, but the receipts are steadily and firmly increasing every week.

Reuter's Yunnanfu correspondent says that Mr. Dawley, the railway engineer, has renewed his contract for two years. There is a prospect of a line to Kochiu being built.

MALAYA

Singapore Railway.—The Legislative Council of the Straits Settlements has approved of the sale of the Singapore Railway to the Federated Malay States Government for the sum of S.S. $4,136,000. It will be remembered that on January 1, 1912, the Railways of the Straits Settlements came under the management of the Federated Malay States Government. The terms called for a lease of 21 years at an annual rental of $95,200, subject to septennial revision. However, the expediency of selling the Railways to the F. M. S. Government was even at that stage under consideration, and a joint committee was appointed to consider the question of price. In the Singapore Legislative Council, the Colonial Secretary in moving that the Council approves the sale, said that it would be within the recollection of hon. members that towards the close of 1911 a proposal was made and approved for the leasing of the Singapore Government railway to the F. M. S. Government for the sum of $150,000 a year. Early in 1912 it appeared that this arrangement did not altogether meet with the approval of the unofficial members of the Federal Council and, in consequence, it was suggested that the F. M. S. Government should buy the railway outright instead of leasing it from year to year. The unofficial members of the Legislative Council were sounded on the subject, and the approval of the Secretary of State was obtained, and afterwards a committee was appointed for fixing the price at which this railway should be handed over. That committee consisted of the Colonial Treasurer, Treasurer of F. M. S., the General Manager of the F. M. S. Railways and the Colonial Engineer, and in October the Colonial Treasurer reported that the price fixed upon by the committee was $4,136,000, which was the amount mentioned in the motion. He did not think there would be any opposition to the selling of the railway, but there might be a certain amount of criticism regarding the figure at which it was being sold, and he would, therefore, give some explanation as to the manner in which the figure was arrived at. The gross capital account at the time of the valuation was $4,725,404.34, whilst the depreciation for rolling stock, plant, tools, etc., on the basis agreed upon, was fixed at $220,293.62. The rebuilding of stations at Bukit Panjang, Bukit Timah, Newton, Holland Road and Cluny Road amounted to $21,500; the replacing of abutments at Orchard Road and Killiney Road, $20,000 each ($40,000); renewal of pontoons and dolphins at Woodlands, $19,649.23; re-construction of telegraph and telephones (new posts), $4,500; cost of re-laying the line from Tank Road to Woodlands, $298,549.26; the total deductions amounting to $604,492.11. The capital account was thus reduced to $4,120,912.23. To this had to be added $29,314.27, being additional expenditure for heavy rails, and after a deduction $14,250, the cost of a house sold to St. Mary's Home (balance not yet repaid to the railway) the balance left, in round figures, amounted to $4,136,000. Regarding any criticism there might be on the gross capital account mentioned he might say that the original estimate for constructing the Singapore railway from Tank Road to Woodlands was $981,440 and the revised estimate in 1901 was $1,447,886, the total cost in 1903 being $1,808,353. It would be seen from that, although the capital account up to the present represented $4,725,404.34, that was a figure for which considerable latitude must be allowed for deduction, and the sum they were obtaining for the railway was by no means one which was disadvantageous to the Colony. With regard to the items that had been deducted he had had the opportunity of looking at the figures of depreciation referring to the Nigerian railway and the amount there was much higher than in their case. So, therefore, the figures, as worked out by the committee, were to the advantage of the Colony. If they considered the profits made, the figures again worked out to their advantage and he did not think that the amount arrived at by the committee was one which in any way should be unfavourable to the interests of the Colony.

GENERAL

Sino-Japanese Railway Conference.—At the recent conference at Tokyo the question of through traffic was exhaustively gone into, the subjects considered being:—Through traffic stations, through fare table, charges for parcels, free weight limits for passengers' baggage, charges for excess weight of baggage, availability of through tickets and their forms, indemnifications for loss and damage to parcels and baggage, settlement of accounts and distribution of the shares of the respective railways, the through traffic Management Office, and the official language, English being adopted.

The business of through traffic management is to be undertaken in turn by the railways concerned, and the Imperial Government Railways of Japan are to be the first to assume the management of the through traffic.

India-China Communication.—An Indian contemporary says:—What is destined to become a link in the railway between India and China is about to be forged in Assam. This is the railway from Gauhati to Sadiya. Surveys, it was stated, have already been made and in about five or six years' time, the railway will be an accomplished fact. The new railway will not pass over the Brahmaputra, but run along the northern bank of the river. It seems that the railway will eventually be extended to the Chinese frontier and it may also possibly form part of the railway between India and Burma. It is interesting to find that the place known as Sadiya has not yet found a definite location on the map. Engineers from Dibrugarh have been trying to find a suitable site for the future capital of the North East Frontier Province. At present, Sadiya is nothing more than a name in spite of its bazaars and a few houses, the latter by no means of the skyscraper order.

A Non-Partsan Commentary on the Urga Protocol

(*Continued from page 523*)

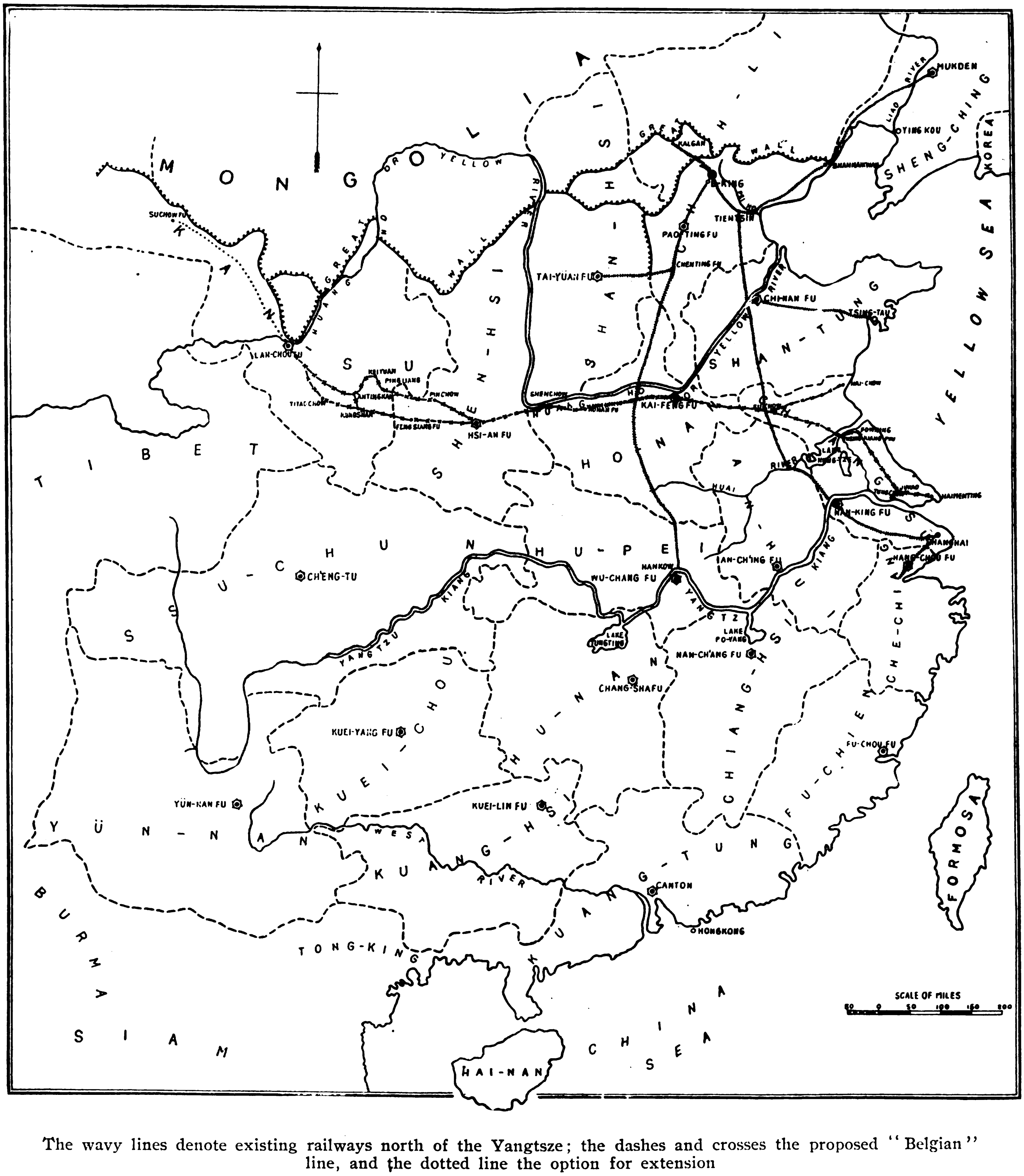
the frontier. The strictness and alleged impracticableness of the methods employed is said to have had a very bad effect on the import. It has been suggested that a method more efficient and less harmful to trade would be the adoption of preventive measures amongst the herds in Mongolia itself. It is, however, to be supposed that the extreme difficulty of instituting such measures amongst a population so scattered as that of Mongolia has deterred the Russian Government from suggesting the attempt.

To conclude: it appears that the Urga Government are now taxing heavily the import of Chinese goods, while admitting Russian goods free. From Chinese sources it is stated that in consequence living has become very dear, which is probably true. It will be interesting to await the result to see whether the Russian merchant will rise to the occasion, be content with smaller profits, and succeed in supplanting the Chinese or not.

April 10th, 1913.

A Reuter telegram from Chengtu says that Szechuan is reported to be negotiating a provincial loan through the German Consul for Tls. 20,000,000 The slaughter tax and the oil tax will be security.

THE LUNG-TSING-U-HAI RAILWAY



The wavy lines denote existing railways north of the Yangtsze; the dashes and crosses the proposed "Belgian" line, and the dotted line the option for extension

TRAMWAYS

Shanghai Tramways

The returns of the Shanghai Tramways (Foreign Settlement) for the month ended April 30, 1913, are as under:—

	1913. $	1912. $
Effective receipts (after deducting loss by exchange	270,454.91	246,266.49
Passengers carried	13,421,504	12,203,824
Car miles run	863,892	888,983

The loss by exchange of subsidiary coinage for the period was $72,747.37 equal to 22.56 per cent. of the gross cash collected on the cars as compared with $75,017.31 24.95 per cent. for the corresponding period last year.

Week ended April 23:—

	1913. $	1912 $
Effective receipts (after deducting loss by exchange)	16,128.34	14,978.88
Passengers carried	810,962	762,207
Car miles run	50,915	52,250

The loss by exchange of subsidiary coinage for the week was equal to 23.26 per cent. of the gross cash collected on the cars as compared with 26.18 per cent. for the corresponding week last year.

Week ended April 30:—

	1913. $	1912 $
Effective receipts (after deducting loss by exchange)	14,671.77	14,887.74
Passengers carried	733,068	742,197
Car miles run	48,984	51,294

The loss by exchange of subsidiary coinage for the week was equal to 23.27 per cent. of the gross cash collected on the cars as compared with 26.10 per cent. of the corresponding week last year.

Week ended May 7:—

	1913. $	1912 $
Effective receipts (after deducting loss on subsidiary coinage)	18,559.36	15,907.76
Passengers carried	941,406	807,763
Car miles run	53,892	53,391

The loss by depreciation of subsidiary coinage for the week was equal to 23.37 per cent. of the gross cash collected on the cars as compared with 26.29 per cent. for the corresponding week last year.

Week ended May 14, 1913:—

	1913. $	1912. $
Effective receipts (after deducting loss on subsidiary coinage)	17,688.02	14,925.69
Passengers carried	887,496	767,258
Car miles run	52,856	52,787

The loss by depreciation of subsidiary coinage for the week was equal to 23.69 per cent. of the gross cash collected on the cars as compared with 25.93 per cent. for the corresponding week last year.

Electric Tramways in Japan.—According to the *Osaka Asahi*, the profits of the electric tramways in the neighbourhood of Osaka, Japan, for the half-year ending March 31st—with the exception of the Keihan Electric Tramway—have shown a heavy decrease as compared with the figures for the preceding period. The various companies are experiencing great difficulty in arranging their rates of dividend for the period just closed, but owing to various circumstances some cannot reduce their dividends, and these have determined to pay the same dividend as hitherto declared. It is said that 13 per cent. for the Hanshin, 9 per cent. for the Nankai, and 7 per cent. for the Mino-Arima are foregone conclusions, while 6 per cent. for the Hankai and 5 per cent. for the Koya Tozan and the Osaka Tramway are almost equally certain. The directors of the Keihan are inclined to recommend a dividend of 6½ per cent., but the large shareholders are demanding an increase to 7 per cent. The Kyoto Electric Tramway has suffered the heaviest decrease of profit, and opinion is divided among the directors as to whether 3 or 4 per cent. should be declared.

Foreign Loan for the Aichi Tramway.—The *Asahi* reports that the Aichi Electric Tramway Company, of Nagoya, Japan, has negotiated a loan of Y.1,000,000 through Messrs. Samuel & Co. The rate of interest agreed on is 7½ per cent., and the amount is receivable by the company at par. It is further agreed that the company will import rails and machinery to the value of Y150,000 through Messrs. Samuel Samuel & Co., and the balance of the loan is to be drawn as required within one year from the date of the contract, which was to be signed at the end of May or early in June. With the money thus raised, the company will start the construction of a new line, 8 miles long, from Yokosuka, Chita district, Aichi prefecture, to Handa.

The Shioya Tramway Extension.—The extension of the Hyogo-Suma (Japan) electric tramway line to Shioya is making satisfactory progress. The section from the Shioya side being finished, work is now in progress along the shore near the Imperial forest, and should be finished by the beginning of July. The Company hopes to open the whole line to traffic before the summer months in order to carry people to Shioya for sea-bathing.

Mr. Kawanishi, President of the company, and other Directors are contemplating an extension to Akashi. In their opinion the difficulty arising from the narrowness of the road at Maiko may be overcome by the use of an elevated track.

The Tokyo Tramways.—Mr. Inoue, chief of the Tokyo Municipal Electricity Bureau, is quoted by the *Tokyo Asahi* as stating that the tramways extend now well nigh 142 miles and the cars on daily service number on an average 950. By the 5th year of Taisho, when the redemption of the first instalment of the foreign loan is due, the construction of all the projected lines will have been completed, while the installation of some 460,000 electric lamps will be completed in the course of next year. In these circumstances, the authorities are quite confident that the receipts will prove more than sufficient for the payment of the loans. The Tokyo Municipal Electricity Bureau has decided to issue bonds in Paris as soon as opportunity offers itself, to the amount of 14,500,000 *yen*, with a view to raising sufficient capital for thy installation of 460,000 electric lamps and the construction of the projected new tramwae lines.

The Nankai Railway Company.—The net profit of the Nankai (Japan) Railway Company for the half-year just ended amounts to Y.472,597, including a surplus of Y.241,247 brought over. This sum it is proposed to dispose of as follows:—

Legal reserve	...Y.11,600
Bonuses of the officials	6,000
Dividend, 8 % per annum ...	286,944
Carried forward...	168,053

The board of directors has adopted a proposal to construct a new line from Wakayama (the present terminus) to Deshima, Wakanoura—a distance of 3½ miles. The funds required for building this new line, estimated at Y.650,000, are to be raised by a temporary loan.

The Hanshin Electric Tramway Company.—The net profit of the Hanshin (Japan) Electric Tramway for the half-year just closed amounts to Y.445,758, including Y.85,923 surplus brought over. The profit is proposed to be disposed of as follows:—

Legal reserve	...Y.18,000
Bonuses for officials...	19,500
Dividend, 13 per cent. per annum	351,000
Carried forward...	59,357

It is reported that the Hanshin (Osaka-Kobe) Railway Company intends to increase its capital to 14,000,000 yen or double the present amount, for the completion of the proposed lines and some improvement works.

Peking Tramway Co.—It has been announced that the construction of the Peking Tramways was to begin early in June.

Yokohama Tram Companies.—The Yokohama Electric Lights Company is planning to build a light electric railway from Yokohama to Uraga for the distance of five miles at an expenditure of 650,000 yen. An application will be forwarded to the government after the matter is fully approved by the general meeting to be held June 20th.

At a general meeting of the Yokohama Electric Tramway Company a proposal of increasing the present capital of three million yen to 6 millions was to be submitted for their approval.

Laohutan (Dalny) Line.—The results of surveys made by experts of the South Manchuria Railway Co. show that the proposed extension of the electric tramway on the Laohutan suburban line from the present terminus at Creek Bridge to Laohutan will cost approximately Y.80,000, if a tunnel were to be excavated, and only about Y.10,000, if the track for the extension is to be laid along a ledge to be made on the west side of the hills by cutting work.

INDUSTRIAL

New Flour Mill in the Hokkaido.—The *Asahi* reports that the Suzuki Shoten, of Kobe, Japan, who purchased the Sapporo Flour Mill Company some years ago and have been supplying the Hokkaido with flour, have decided to construct a flour-mill at Otaru, where there are facilities for obtaining supplies of wheat. This plan has been devised owing to the fact that the demand for flour in the Hokkaido has largely increased of late, and the Sapporo Mill cannot meet requirements. The new mill at Otaru is designed for a capacity of 250 barrels a day.

Japan's Spinning Industry—According to returns published by the Japan Cotton Spinners' Association, during the second half of last year there were 24 spinning companies in Japan, with an aggregate paid-up capital of Y.68,429,000, reserve funds amounting to Y.27,830,400, and with debentures and other loans outstanding amounting to Y.20,089,000. The total net profit, after deducting the reserve for depreciation of machinery and buildings amounted to Y.8,934,000. Compared with the preceding period, the amount set aside for depreciation showed an increase of Y.3,104,000, the amount paid in dividends an increase of Y.956, the sum set aside for reserve an increase of Y.950,000, and the amount carried forward an increase of over Y.1,886,000.

Machinery and Japanese Tea.—Kobe tea has had the reputation of being unattractive in appearance in the leaf, but of excellent colour and flavour when infused. Last year, says the *Asahi*, complaints were heard among the foreign tea firms in Kobe and also on the American market against the quality of Kobe tea. These complaints were due to Yamashiro leaves—which were rubbed by machinery—being mixed

with the leaves shipped last year. Tea producers in Nara prefecture have begun to use machinery extensively, the system having been introduced from Shizuoka. On the other hand, the foreign tea firms in Kobe strongly object to the mixture of the hand and machine prepared leaves. They complain that the colour of the tea rubbed by machinery is not so black as that rubbed by hand, and the manner of rolling is not so satisfactory. The consequence is that when the tea is refined at Kobe a large quantity of dust is made, which results in a serious loss of weight and which in turn make the price higher. Since the prohibition of the use of coloured tea in America, it has become necessary for exporters to make tea as black as possible in appearance, and to have the leaf nicely rolled. Owing to the smaller purchases made by the foreign firms last year, a considerable stock of the second picking of Yamashiro tea is still held in the interior, and some brokers have sustained heavy loss. The producers of Yamashiro tea have extended the use of machinery this year, and have lately purchased over 200 new leaf-rolling machines. The use of machinery, adds the Osaka journal, will save labour and other expenses, but if the tea is intended for export, leaves must be prepared by hand, or, if machinery is used, it must be improved so as to remove the present defects of machine-rolled tea.

Sankosha Glass Factory—The Sankosha Glass Factory proposes to build a new workshop at Hsiaokangtzu on a tract of land of 1,000 *tsubo*, not including workmen's quarters.

New Ice Plant for Manila.—A new ice plant with a capacity of seventy tons is shortly to be erected in Manila by Mr. B. Montague of Batangas. The machinery will be supplied by Messrs. Frick & Company of Waynesboro, Pennsylvania.

Cotton Weaving in Okayama.—The cotton weaving industry is making rapid progress in Okayama prefecture, Japan, and power-looms are rapidly replacing hand-looms. In Ota and Shizuki district power-looms showed an increase of 550 last year and there are now 800 power-looms in the two districts mentioned, where weaving, which had been carried on by farmers as an auxiliary, is rapidly becoming the sole occupation of those engaged in it. Not so many power-looms are used in Kojima district, the number being about 350. In Tsukubo district there are 200; in Oku and Jodo districts 50, and in Ikaiwa district 100. The total value of the cotton cloths produced in these districts now amounts to about Y.5,000,000 a year, and is expected to increase with the growing popularity of power weaving.

MINING

The Fushun Collieries.—The monthly outputs of the Fushun Collieries for the first three months of this year were as follow:

	January. Tons.	February. Tons.	March. Tons.
Unscreened... ...	52,589	51,045	66,718
Lump	30,197	28,868	28,390
Dust "A"	40,469	39,933	37,689
" "B"	325	—	—
Total	123,580	119,846	132,797

In December last it was reported that, owing to the Fushun colliery not being advantageously situated for exporting, the South Manchurian Railway, which works it, was turning its attention to the production on the spot of sulphate of ammonia, which is largely imported into Japan from abroad for the manufacture of fertiliser. More recent reports would indicate that this expedient for getting rid of stocks is not at present necessary. The colliery disposed of 1,500,000 tons of coal last year and expects to increase its output during the present year to 2,000,000. The closing of the Yubari colliery has been to the advantage of Fushun, and the demand in Korea is growing, in spite of the higher prices asked. Even the export trade appears more hopeful than formerly, since Fushun coal, which had formerly reached no further than Singapore is reported to have been shipped to Bombay of late.

Kailan Mining Administration.—The total output of the Kailan Mining Administration's mines for the week ending April 19 amounted to 36,044.85 tons and the sales during the same period to 51,334.09 tons.

For the week ended April 26 to 34,164.90 tons and the sales during the same period to 44.205.10 tons.

For the week ending 10th May, to 36,247.55 tons and the sales during the same period, to 42.567.03 tons.

For the week ended May 17 to 36,756.57 tons and the sales during the same period, to 43,665.64 tons.

The Chinese Engineering & Mining Co., Ltd., has declared an interim dividend of 3½ % free of Income Tax on account of the year ending 30th June, 1913, which was payable on the 15th May.

Production of Copper in Formosa.—According to the *Tokyo Economist*, the production of copper in Formosa has been increasing rapidly year after year. The total value of copper produced in the colony amounted to Y.1,031,460, a two-fold increase on the figures for the preceding year. Last year the copper mines in the colony suffered severe damage from storms and floods, but despite this a very satisfactory result was shown. If the working of the mines is not interfered with by storms this year, and full operations are carried out, an increase of 50 per cent. will be shown in the output. Last year copper represented 25 per cent. of the total mineral products in the colony. At present the Kinkwaseki mine, in Formosa, occupies fifth rank among the copper mines of the Japanese Empire, and it is expected that the mine will rise to third or even second position this year.

Asbestos Mine Near Chinchou.—The asbestos mine at the eastern foot of Daioshozan (Mt. High Priest) yields asbestos of fine quality which compares well with second class goods on the London market. This mine is now being worked under the joint management of the Japanese concessionaire, Mr. Masuda, and the Japan Asbestos Co., Tokyo. The working gang has been much enlarged and now it comprises 4 Japanese foremen and about 100 Chinese miners. The daily output is about 700 *kin* and is supplied principally to the Imperial Japanese Navy, the Imperial Government Railways and factories using steam engines. The mining concession contains 210,000 *tsubo* and is at a village called Tungchiakou

Gold Mines in North Manchuria.—Many gold mines are located in the north-western part of Amur Province. Especially, the upper valley of the Amur River, that is the district stretching for 1,500 li from the point where the Shilka converges into the Erwatoho down to the Iaheiho, is literally covered with gold dust. On the northern bank, which is Russian territory, mining is carried on successfully under the system of colonization, but on the opposite side, the wild tribes living in the region thereabout having no thought of operating the natural wealth little is done toward excavating the precious metal. There is a mine, however, at Kilarin, supposed to be the richest gold mine in North Manchuria, which is worked with somewhat up-to-date machinery. But owing to the ineffective military protection given to it on account of the difficulty of communication, the mine suffered looting several times. Since the raid was made by Mongolian troops, last year, the Chinese garrison was reinforced but, the troops being outnumbered by lawless bands, who poured in from all directions for the very purpose to rob the output at every given opportunity, they are practically helpless to protect the mine.

Aroroy (P. I.) Mines.—The Syndicate Mining Company has acquired the property formerly leased from the Eastern Mining Company, in the Aroroy district and has started to develop it. A 60 ton mill which will cost P. 175,000 will be purchased and it is expected that it will be in operation in six months' time. The property is situated in the Aroroy mining district, where already are the Colorado mine—perhaps the most successful in the islands—and the Keystone. The addition of this important third to the number is an event of exceptional interest.

American Mines in Korea..—America has a large mining interest in Korea. The oldest and most profitable gold mines in the peninsula are those at Wun-san, which are owned and operated by an American corporation called the Oriental Consolidated Mining Company with a capital of $5,000,000. The corporation was organized by James R. Morse of New York in the nineties, and was incorporated under the laws of West Virginia. The Su-an gold mines, also owned by an American concern known as the American Mining Development Company, are reported to be in a prosperous condition. According to the latest information the annual output of the Su-an mine is about 1,000,000 yen, while the Unsan gold mine annually yields some 3,000,000 yen gold. These two mines are the principal gold mines conducted by foreign concerns in Korea. Besides these, there is a gold mine at Chyansong, which has been recently purchased by a London firm and is now conducted under the management of French experts. This mine is, however, still in the course of experimental digging.

The Kapson copper mine at Hamnan, belonging to the American Mining Development Company, and the Huchyong copper mine, owned by the Italian Mining Company, are also in an experimental stage. Applications for gold mines and for gold-dust mining are occasionally sent in by foreigners, but they are all on a small scale.

HARBORS

Sendai to Rival Yokohama.—Mr. Takagi of the Miyagi (Japan) Local Government reports a scheme already in hand for dredging the sea of Matsushima so as to enable steam ferries to go freely to any of the pine-clad isles, without fear of getting stranded on shoals and also to reconstruct the harbor of Sendai with a view to enable steamers of 4,000 tons to anchor with ease, the scheme being that this should be completed within the space of ten years. Should this plan be consummated ships coming from America would find it far more convenient to go to Sendai than to Yokohama.

Wharves at Vladivostok.—According to a Tokyo newspaper, the Russian Government will undertake from the present fiscal year an extension of the harbor limits of Vladivostok, together with the construction of an additional wharf and three pontoons, on a three-years' programme, at an estimated outlay of Roubles 7,000,000, of which Roubles 1,600000 will be invested in the current year. There are now the following six wharves and pontoons in that port:—

1. I.R.M. Customs Wharf	1,536 ft.
2. C.E.R. Stone Wharf...	702 „
3. „ Floating Pontoon... ...	1,122 „
4. R.V.F. Stone Wharf	324 „
5. „ Floating Pontoon... ...	282 „
6. Municipal Wharf	348 „
	4,314 ft.

These wharves combined are capable of berthing at the same time fourteen vessels and of handling altogether 37,000,000 puds (616, 667 tons) of goods per annum.

The volume of traffic of the port is, however, markedly growing year after year, having increased by 46,120,000 puds of goods during the past five years.

Under such conditions, the present harbor arrangements can hardly cope with the situation. When the whole work is done, over forty vessels are expected to be able to be berthed alongside the wharves.

Tokyo Harbor Construction Pan.—Mayor Baron Sakatani introduced recently into the Tokyo Aldermanic Assembly his plan for the construction of a harbor in Tokyo, which was an important plank in his platform at the time of his nomination. According to the plan, which was referred to a committee at once, the work is to be completed in ten years at the cost of 20,000,000 yen, and for it is to be raised a loan of 31,890,000 yen. The loan, however, is to be issued not at one time, but at several times, such as 6,000,000 yen each in first, third and fifth years, 7,000,000 yen in the 7th year and 6,890,000 yen in the 9th year, for a 100 yen face value, net receipt of 90 yen and a 5 per cent. rate. As to the redemption of the loan Mayor Sakatani expects to effect this in 26 years after the completion of the work in case the Government gives any subsidy towards the construction expenditure as it has done towards the construction of important harbors like Tokyo in the past, but failing this, in 44 years.

Dairen Quay.—The reconstruction of the quay wall of the western side of west (Main) Quay, Dairen, to vertical facing, which was taken in hand by the South Manchuria Railway Co.'s Harbor Works authorities at the estimated cost of Y.465,000, is now making good headway. Concrete blocks have already been laid down.

The work is expected to be finished in May, 1915.

South Manchuria Railway Plans.—What new plans of harbor works have been taken in hand since the beginning of the present fiscal year or are on the programme for future execution by the S.M.R. Co. are tabulated as follow :—

	To be completed by Fiscal Year	Estimated outlay
Construction of New Quay	1917	Y.3,000,000
„ „ Hazard Goods Pier at Jijiko ...	1914	Unknown
Reclamation of shore-line at Jijiko	1914	745,000
Construction of North-west Breakwater	1916	5,000,000
Construction of Breakwater for Junk Basin ...	1914	150,000
Dredging work...	1915	1,200,000
Reconstruction of the entrance of the Dairen Dock...	1913	150,000
Construction of Wharf at Japanese Settlement, Yingkou	1913	110,000
Bunding work at Antung	1913	4,800
Dredging of the Yalu ...	1914	100,000
Extension of Shanghai Wharf	1914	15,000
Reconstruction of East Quay wall	1913	800,000
Reconstruction of quay wall of west side of West (Main) Quay ...	1914	640,000

Harbor works at Lienshan.—The harbor works at Lienshan, Manchuria, require Y.300,000 more for their completion. However, the difficulty in the shape of the lack of funds has tied up the work.

Kobe Harbour Works.—The construction of the Kobe harbour works, says the *Kobe Shimbun*, is making satisfactory progress. Out of the eighty odd caissons to be used in the construction of the piers, about fifty are already finished. The authorities concerned are making great efforts to have the western pier ready for use by steamers by the end of June.

Pier at Fusan.—The construction of the pier at Fusan, which was started some months ago at an estimated cost of 780,000 yen, has been completed.

LUMBER

Exploiting Philippines Timber.—A company is being formed, according to the *Manila Daily Bulletin*, to exploit the timber resources of the Philippine Islands on a gigantic scale. It is stated that it is likely that a line of freight steamers will be employed in the movement of timber to points of distribution, which will be San Francisco, New York and London. The company is now negotiating for two concessions of 500 square miles each on one of the islands of the Philippine archipelago. The timber will be shipped in its crude state and given the manufactured finish in the United States.

LIGHT AND POWER

Anglo-Japanese Hydroelectric Co.—It is reported that the Anglo-Japanese Water Power Company will shortly establish its second power station, which will supply 4,000 H.P. of electricity in addition to the present supply.

This company is now supplying with electric light and power all the districts in Enshu Province, Japan, with Hamamatsu as its center, with the exception of the towns of Fukuroi, Nakaidzumi, and Futamata, which are supplied by the Tenryu Electric Company. The light supplying capacity was at first estimated at 25,000 lamps, but the demand has exceeded the estimated capacity, the number of lamps having reached 30,000. The consequent shortage of supply has made the company decide to establish another powerhouse to meet the demand. The company, having secured a suitable site on the River Tenryu for the construction of the new factory, has recently applied for a permit to start the work. The new instalment will add 4,000 horse-power to the present supplying capacity.

Kyoto Electric Co.—The Kyoto Electric Co. it is said will shortly issue a loan of either 1,000,000 yen or 1,500,000 yen for the expansion of work and the redemption of old debt.

Hankow Light & Power Co.—During the financial year ended March 31, 1912, the profit was £1,731.18s.10d. The receipts for the year as compared with the corresponding period for the year ending 31st March, 1911, are as follow :—

	Year ending 31st Mar. 1911 £	s.	d.	Year ending 31st Mar. 1912 £	s.	d.
Private Lighting.. ..	6,769	12	0	7,929	1	2
Public Lighting	1,824	17	0	1,981	17	7
Power	59	0	4	103	10	1
Motor Rents..	278	2	0	334	14	6
Installation & Repairs.	49	14	6	428	15	3
	£8,981	5	10	£10,777	18	7

The gross receipts for the year under review show an increase of £1,796 12s. 9d., or nearly 20 per cent.

The working expenses for the year were 38.95 per cent. of the total receipts, as against 50.89 per cent. for the year ending 31st March, 1911, showing a decrease of 11.94 per cent.

Baguio Installation.—The Benguet Commercial Company has installed an electric light plant in the Baguio Hotel in connection with its cold storage plant, the only one now carrying stocks of meat in the city. The plant has a 200 light capacity and the dynamo is a Westinghouse. A 20 h. p. boiler has been installed to provide the motive power.

Kawakita Electric Works.—The Kawakita Electric works in Osaka, which were formerly run by Mr. Yoshino Kawakita, have recently been converted into a joint stock system and at the same time the capital increased to 1,000,000 yen. Mr. Kawakita was nominated the president of the new company.

Osaka Electric Light Supply.—The authorities in the Osaka (Japan) Municipality have recently planned the municipalization of electric light supply in the city and approached the directors of the Osaka Electric Light Company, which monopolizes service in Osaka, but the negotiations failed a few days ago, because of the difference of opinion about the price, namely, the municipal authorities offered 30,000,000 yen or so while the company demanded nearly 50,000,000 yen. The Municipal authorities are trying to persuade the company to lower the rates of electric light supply. On the other hand, however, it is reported that Baron Fujita may act between the Municipality and the company to find out some means of compromise about the price.

Tokyo Electric Bureau's Revenue.—The account of the Electric Bureau of the Tokyo Municipality for the fiscal year 1912-13 was 9,373,145 yen of revenue and 3,912,622 yen of expenditure with a balance of 5,460,523 yen, and out of this balance were paid the interest on the bonds, etc., etc.

Liaoyang Electric Light Co.—The Liaoyang Electric Light Co. adopted at its second regular general meeting the following statement of accounts for the last term :—

Total profit..	Y.20,080
„ outlay..	12,673
Net profit	7,407
Brought forward from preceding term	198
Total	7,605
Disposed of as follows :—	
Reserve fund	Y. 2,400
Bonus to officers..	600
Dividend to shareholders	4,200
Carried forward to the next term..	405

THE PHILIPPINES BUREAU OF SCIENCE

(*Continued from page 524*)

laboratory space. Unless the appropriation is increased, the Bureau cannot continue to develop. Its greatest usefulness is curtailed by lack of funds. The greatest need was for enlarged accommodations for the testing laboratory, and additional space for the vastly increased work in testing and in other directions. In regard to space, it was felt that the only way in which it could be satisfactorily supplied, was to add to the west end of the main building of the Bureau of Science, a wing of the same dimensions as that which was begun on the east end two years before

Work at the Iloilo sugar laboratory had increased so much that it had been necessary to send assistance to the man regularly detailed there. It was desirable that an experimental station should be established within easy access of the Iloilo laboratory where cane from different countries could be compared and new varieties propagated. If a suitable experimental farm should be provided and funds for its equipment and maintenance appropriated, the entomologists and botanists of the Manila laboratory temporarily could assist with experimental work, until such time as it became necessary to maintain those scientists permanently for that work. It was recommended that an appropriation of P. 30,000 be added to that for the Bureau of Science, in order that parallel salaries might be maintained between the Bureau and other branches of the Government. A fund was necessary to enable the Bureau to make a thorough pathological and bacteriological investigation of the subject of animal diseases.

In regard to the library, an advisable expenditure would be P. 50,000 to complete the incomplete sets now in the library.

If the services of one or two additional men could be secured, the work on the fish and fisheries of the Phillipines could be greatly extended.

SUGAR

The Sugar Industry in Formosa.—The *Osaka Mainichi* (Japan) is pessimistic about the outlook of the sugar industry in Formosa. In the opinions of the Osaka journal, the time has now arrived for effecting a revolution of the industry. The planting of the sugar cane for this season, says the journal, is now practically completed, and judging from the area planted, the output of sugar this year may be estimated at about 4,500,000 bags. The sugar mills in the colony, however, used the cane preserved for the shoots to be planted this year in order to minimise as far as possible the decreased production last year as the result of the damage to the crop by storms. This has led to a deficiency in the supply of the shoots for planting this year, and shoots have been imported from Hawaii. Happily the weather has been very favourable since the planting, but the shoots imported from abroad have been invariably unsatisfactory. In addition to this, the tendency is increasing among the farmers to cultivate rice, on account of the high price of the cereal, rather than sugar cane, while the Formosan Government is concentrating its energies on encouraging the cultivation of cotton, hemp, and other new products, neglecting the sugar industry. In these circumstances it is believed that the output of sugar this year will not exceed 3,000,000 bags. In view of this state of things the Meiji Sugar Company has decided to absorb the Toroku Sugar Company in order to strengthen the position of the sugar industry in Formosa. It is believed that the sugar companies now in existence in Formosa, numbering over 30, will be eventually absorbed into five or six big companies. The storms of last year, concludes the Osaka journal, have dealt a heavy blow to the new sugar companies in the colony, which are not yet on a stable basis. They have now been compelled to take various measures to repair the damage they suffered, and the time is now opportune for a complete revolution of the sugar industry in Formosa.

COTTON

Dah Sun Cotton Spinning Mill.—It is interesting to note that the attention of the Chinese people toward industrial enterprises is growing more pronounced, and we find that people of Nan-Tungchow, the native place of the distinguished Chang Chien, is especially active in this direction. A number of factories and mills were established many years ago, and are reported to enjoy a good standing.

One of the biggest companies is the Dah Sun Cotton Spinning Mill, which is assuming larger proportions and greater importance each year. The Mill has already established a branch at a place called Kiu-Loong, and both the Head Mill and the branch are yielding handsome profits. A Directors' Meeting was called recently, and they decided to expand the business and put up a Spinning Mill. The original proposal was to draw Tls. 300,000 from the assets of Head mill and to subscribe for Tls.300,000 more, totalling Tls.600,000, as capital for the new spinning mill. It was, however, calculated that the purchasing of new machinery and other initial necessities would require an outlay of Tls. 800,000, so Tls. 400,000 will be drawn from the capital of the head mill, and another Tls. 400,000 will be offered for subscription.

The meeting also raised the question of the importance of Haimenting as a port, and they decided to establish a branch at the place. This branch will have Tls. 30,000 as a start, and the Directors will soon apply to the Ministry of Industry and Commerce for registration.

FINANCIAL

Company Promotion in Japan.—Returns published by the Department of Agriculture and Commerce show that during March 486 new companies were formed with an aggregate capital of Y.12,729,196, showing an increase of 163 in the number of the companies and of Y.6,024,895 in the amount of the capital on figures for the preceding month, and an increase of 176 in the number of companies—but a decrease of Y.1,269,734 in the amount of capital—on the figures for the corresponding month last year. This has brought up the total number of the companies formed this year to 1,170, and the total amount of capital to Y.26,040,065, representing an increase of 430 in the number of companies, but a decrease of Y.4,167,462 in the amount of capital on the figures for the corresponding three months of last year. Divided according to the nature of the proposed business, the companies formed in March are as follow:—

Agriculture	8
Marine Produce	2
Forestry	2
Manufacture	162
Mining	8
Commerce	16
Transport	27
Others	116

Tokyo Electric Bureau.—As already reported, the Tokyo City Electric Bureau has decided to float a loan to the amount of 15,500,000 *yen* with the view of securing the funds necessary for the construction of the projected new tramway lines, eighty miles in length, and the installation of 460,000 electric lamps, as well as supplying a deficit of 3,000,000 *yen* in the proceeds of the city loan at the time of the municipalization. The proposal is now under consideration by a committee composed of members of the Municipal Council. It is stated that the interest on the loan will be 5½ per cent. and the term of redemption 23 years, beginning with 1917. The Council is expected to pass the bill unaltered.

The Siam Commercial Bank, Ltd.—The Balance Sheet for the half-year ending 31st March, 1913, stated that the net profit, after making ample provision for all bad and doubtful debts, deducting rebate on bills not due and allowing for interest accrued to date upon fixed deposits and for other contingencies, amounted to Tcs. 335,497.42, including Tcs. 78,556.12, brought forward from the last account.

The Directors recommended that there be transferred to the Ordinary Reserve-fund in accordance with the Statutes .. Tcs.	26,624.13
and transferred to the Extraordinary Reserve-fund .. „	75,000.—
a dividend for the half-year be declared at the rate of 8 per cent. p.a. absorbing .. „	120,000.—
there be applied as statutory remuneration to the Board .. „	7,812.36
and as bonus to the staff .. „	6,277.99
leaving to be carried forward to the next account .. „	100,712.94
	335,497.42

The Comptroller General of the Ministry of Finance certified in the Balance Sheet that Siamese Government 4½ per cent. Bonds of the nominal value of £4,000—(four thousand Pounds)—are held by the Ministry of Finance for and on account of the Savings Department of the Siam Commercial Bank.

Shanghai Municipal Loan of 1913.—The Shanghai Municipal Council announced in the Municipal Gazette that applications amounting to Tls. 565,300 had been received in response to Notification No. 2204, and allotments to the full amount of the new 5½ per cent. loan, namely, Tls. 500,000 had been made, under the direction of the Finance Committee, at par.

Japan's Railway Finance.—During the last session of the Japanese Diet, Baron Takahashi, the Minister of Finance, declared that the funds temporarily borrowed by the Government from various sources on railway account, would be repaid with money raised by means of a foreign loan to be floated at an opportune time. The money so borrowed amounted to Y.100,000,000 in all. Recently short term bonds were issued in London for £3,000,000, and negotiations have been in progress with the Rothschilds in Paris for the issue of the balance. Negotiations have come to a successful conclusion for the issue of bonds to the amount of 200,000,000 francs (Y.77,400,000), bearing interest at the rate of 5 per cent. The issue price is 98, and the bonds are redeemable in ten years.

The following rules have been issued by the Finance Department in regard to this loan:—

1. The Government shall issue Treasury bonds in France for the amount of 200,000,000 francs in accordance with Article 3 of the Finance Law of the Imperial Railways, for the purpose of redeeming the short term bills and other loans, appertaining to railway finance.
2. The rate of interest on this Treasury bond issue shall be 5 per cent. per annum, payable on May 1st and October 1st for the preceding six months.
3. The principal of this Treasury bond issue shall be redeemed on May 1st, 1923, at face value.
4. The bonds issued shall be for 500 francs each, with interest coupons attached, and will not be endorsed with names of holders.
5. The issue price of the bonds shall be 98 francs for 100 francs face value.
6. The interest on the bonds shall be computed from May 1st, 1913.

The total amount owing by the Government for railway finance was as follows:—

1. Borrowed from the Deposits Bureau	Y.37,500,000
2. Borrowed from the currency readjustment fund	5,000,000
3. Short term bills (due on March 14th last)	30,000,000
4. Exchequer bills (due on March 14th)	10,000,000
5. Short term bills (due on April 14th)	25,000,000
Total	Y.107,500,000

Of this amount, Y.9,000,000 borrowed from the Deposits Bureau, and Y.20,000,000 on short term railway bills—Y.29,000,000 in all—were redeemed with the money obtained by a loan raised in London in April, and the money to be raised by the present French loan is to be used for redeeming the balance—Y.98,500,000. Taking a franc at 38.7 sen in Japanese money, Y200,000,000 francs to be now raised will equal Y.77,400,000.

The Government is reticent regarding the commission payable to the underwriters, but it is believed by the leading bankers that the commission is 4 per cent. In this case, when commission and stamp duty have been deducted, the actual amount receivable by the Government will not be more than Y.72,000,000. By the two foreign loans negotiated in London and Paris, the Government will be enabled to replenish the gold reserve held abroad, about which the authorities are much concerned, and supply funds to the Deposits Bureau, which can be made use of by the Government in case of need, and the financial authorities will thus find much relief from their troubles.

The *Osaka Mainichi* remarks that the money market will be little affected by the new French loan, as the amount of money to be supplied to the public is not more than Y.45,000,000 by the redemption of Exchequer bills (Y.20,000,000 due on June 13th) and Railway Notes (Y.2,500,000 due 30th), the balance of the loan money being paid for the settlement of the funds drawn from the Deposits Bureau. But the Government has to redeem Y.10,000,000 of the bonds redeemable in the financial year just closed, purchasing them at market price and more, by drawing lots by the end of June next. In addition to this, the Government has to arrange for the amortisation of Y.50,000,000 worth of bonds redeemable this year. When this money is supplied, a serious change may be brought about in the money market.

New Domestic Loan.—After consultation with leading bankers of both Tokyo and Osaka the Japanese Government decided and then officially announced its scheme to issue a loan 30,000,000 yen worth at the home market for Korea, one object being to prevent the French capital to be shortly imported from affecting the domestic money market. Rate of interest is 5 per cent. the term of redemption four years and half and the price of issue 95 yen. It is said that 16 leading banks both in Tokyo and Osaka have agreed to take up 24,000,000 yen themselves of the new loan.

Osaka Electric Railway Co. Loan.—The Osaka Electric Railway Company at its last directors' meeting decided to float a short term debenture to the value of 2,000,000 yen for an 8 per cent. rate to be redeemed in four years.

The Bank of China.—The Bank of China is to act as the Treasury for the Government. The regulations have been made, and the Customs Revenues of Shanghai and Hankow have already been deposited with the Bank. Mr. Sun Tu-sun, the Director-General of the Bank, has asked the Ministry of Finance to notify the Inspectorate-General of Customs that all Customs Revenues hereafter are to be deposited with the Bank of China.

Chihli Foreign Loan.—The Chihli Tutuh is reported to have concluded negotiations with a Belgian Banking Corporation, for a loan of £500,000, the bonds for which were issued on the market of Brussel and Antwerp. It is said the public were very enthusiastic in buying the bonds.

The interest is said to be 5½ %, and the price to the Government £95½. The Central Government acts as guarantee.

Kwantung Foreign Loans.—A Hongkong telegram states that on account of the discounting of bank note values, the Canton Tutuh has decided to float a loan of £5,000,000 to adjust the financial market. He has wired the Government for approval, and has asked Mr. Liao Chung-kai, who is at present in Peking, to confer with the Finance Minister about this matter.

Japanese Banks and Companies Indebtedness.—The Industrial Bank of Japan has made public the results of an investigation, according to which the total amount of debt of both companies and banks throughout the country, as it stood at the end of the last fiscal year (March, 31st) was 501,566,000 yen, namely 355,566,000 yen of domestic debt and 146,000,000 yen (£14,600,000) of foreign debt.

Another Manchurian Railway Loan.—The *Osaka Mainichi* learns that the Government, encouraged by its recent success in the flotation of loans abroad, intends to issue another loan of 15,000,000 yen in Paris for the Manchurian Railway Company, which feels in need of funds for its undertakings this year.

Public Loan Bonds for Hankow Reconstruction.—The President's Office recently received a wire from Vice-President Li Yuan-hung stating that since the burning of Hankow during the Revolution, trade has suffered greatly and although he has proposed the rebuilding of the town, yet the undertaking was delayed for lack of money; that he had referred this matter to the Provincial Assembly, which had sanctioned the issuing of Public Loan Bonds to carry on the work.

The main features of the Public Loan are as follow:

1. The proceeds of the loan shall solely be used for the reconstruction of Hankow. 2. The amount of the Public Loan shall be Tls. 10,000,000, and the bonds shall be of the following denominations: Taels 5, 10, 20, 50 and 100. 3. The Annual interest 6%. 4. The bonds shall not be sold or mortgaged to foreigners. 5. Repayments shall take place from the fifth year after issuance, and the whole amount will be cleared in fifteen years after the issuance.

Hokkaido Debentures.—The Hokkaido Colonial Bank is issuing debentures for 1,000,000 yen at 6 per cent., issue price not less than 95 yen. Redemption is to be made in 20 years, twice a year, after April 30, 1915.

Mercantile Bank of India, Ltd.—The twentieth annual report states:—The directors submit to the shareholders of the Bank the general balance sheet and statement of profit and loss account for the year ending 31st December, 1912. The net profits for the year, after providing for bad and doubtful debts, and including £29,139 17s. 1d. brought forward from last account, amount to £128,105 0s. 6d. From this sum has to be deducted £19,687 10s. 0d., being the interim dividend of 3½ per cent., free of income tax, on the "A" and "B" shares paid for the half-year ending 30 June, 1912. The directors have added £50,000 to the reserve fund (raising it to £415,000) and £3,000 to the officers' pension fund. They now recommend a further dividend on the "A" and "B" shares of 4½ per cent., free of income tax, for the second half of the year (making 8 per cent for the year), leaving a balance of £30,105 0s. 6d. to be carried forward.

Kawasaki Dockyard Co.—The present capital of the Kawasaki Dockyard Co., in Kobe is 10,000,000 yen, of which 8,000,000 yen is paid up. The authorities of the company have now decided to have the remaining 2,000,000 yen of the present 10,000,000 yen paid up and then to increase the capital to 20,000,000.

Japan's Customs Revenue.—The total amount of revenue from customs in Japan during the period from April 1st to the end of February reached 61,937,892 yen, to which may be added about 5,000,000 yen, the estimate by the authorities concerned for the month of March. Thus the total receipts for the fiscal year ending March 21st are over 66,930,000.

This total shows an increase of 17,000,000 yen or about 34 per cent. over the Government's estimates of over 49,890,000 for the said fiscal year. The excess has never been paralleled in the past in this country, and the reason for it according to the authorities, is the increased importation of foreign sugar, rice, iron materials and manufactures and mineral fertilizers, etc.

Of the customs revenue for the past 11 months ending with February over 58,860,000 yen is allotted to Japan proper, over 1,510,000 yen to Korea and over 2,550,000 yen to Formosa.

Netherlands India.—The *Nederlandsche Staatscourant* publishes particulars of the amounts allocated in the Netherlands Budget for expenditure in the Netherlands East Indies in 1913, from which the following is extracted: —Department of Public Works: 6,494,600 gulden for general building operations; 10,800,900 gulden for irrigation and drainage works, bridge building, road making, etc.; 8,658,400 gulden for harbour works, extensions, and improvements at Sourabaya, Samarang, Macassar, Tandjong-Priok, Pantai Timorbaai, Tjilatjab, Belawan, Emmahaven, and Telok Nibong. Department of State Enterprises: 5,478,000 gulden for railway and tramway construction and extensions. The Budget also includes a special increase of 1,324,000 gulden towards defraying the expenses in connection with the construction of a railway from Cheribon to Kroja.

COMPANIES

Business Companies in Japan.—According to returns made by the Department of Agriculture and Commerce, the number of joint stock, ordinary and limited partnership companies in existence in Japan at the end of 1912 was 13,041, with an aggregate paid-up capital of Y.1,549,369,833, and an aggregate reserve fund amounting to Y.401,111,353.

Green Island Cement Co., Limited.—The report for the year ending 31st December, 1912, states that after allowing for auditors' and Consulting Commitee's fees, writingoff $8,042.54 loss on sale of steam launch *Prudence* and $53,126.56 on account of shortage of limestone at Hok Un and Macao and providing for the statutory depreciation on the Company's buildings, machinery, launches, lighters, etc. the net profit including the sum brought forward from the previous year amounted to $123,064.53, which it was recommended should be applied as follows:—

To the writing off from bad and doubtful assets of previous years, as follows:—

Patent Rights for Clay drying process	$ 918.97
The Century Stone Plant—Shanghai	4,292.98
The Concrete Block Equipment—Hok Un	6,788.44
Bruce, Peebles & Co., Ltd.	3,924.93
Account against the late Compradore...	2,288.55
Canton Property Account	41,905.05
Claim on Tsang King... ...	7,126.98
	$67,245.90

leaving a balance of $55,818.63 to be carried forward to the credit of next year's account.

Inawashiro Water Power Co.—The Inawashiro (Japan) Water Power Company has declared a dividend of 5 per cent. for the latter half of the year ending March 31.

Japan Leather Co.—The Japan Leather Company has declared a dividend of 7 per cent. per annum.

China Import and Export Lumber Co., Ltd.—The report for the financial year ended February 28 showed that the balance at credit of profit and loss account available for distribution was Tls. 51,555.71 which it was recommended should be appropriated as follows:—

Pay a dividend of 8 per cent., absorbing...	Tls.	32,000.00
Transfer to equalization of dividend fund	„	15,000.00
and carry forward to new account	„	4,555.71
	Tls.	51,555.71

Japan Fishery Company.—At the sixth general meeting of the shareholders of the Japan Fishery Company the following accounts were passed:—

	Yen
Profit	1,076.210
Account brought over from the preceding term...	12,844.650
Total	13,920.860

The Hongkong Electric Co., Ltd.—The report of the Board of Directors states that for the year ending 28th February, 1913, the balance at credit of profit and loss account was $273,099.08, and after deducting directors' fees ($3,000) there remained a sum of $270,099.08 available for appropriation, which the directors recommended should be disposed of as follows:—

To pay a Dividend of 16 per cent.:— Say, $1.60 per share on 60,000 shares	$ 96,000.00
To place to Reserve	30,000.00
To write off Plant Account for depreciation	106,675.01
To write off Property Account for depreciation	16,218.71
To write off Furniture Account for depreciation	133.50
To pay a Bonus to Staff	5,126.02
To carry forward to next Account	15,945.84
	$270,099.08

Iloilo Dock and Lumber Co.—The Iloilo Dock and Lumber Co. has been organized for the purpose of building and operating dry-docks and marine railways, and engaging in saw and general lumber milling, with headquarters at Iloilo. Articles of incorporation for the new enterprise have been filed.

The company has a capital of P.150,000, divided into 1,500 shares at a par value of P.100 each. The entire capital stock has already been paid in.

Sugar Companies to Amalgamate.—The Meiji Sugar Refining Company, at its general meeting of shareholders, decided to amalgamate with the Chuwo Sugar Refining Company.

Nippon Spinning Company.—The Nippon Yuan Spinning Company at its semi-annual general meeting was to declare a divided of 15 per cent.

Meiji Fire Insurance.—The Meiji Fire Insurance has held its semi-annual general meeting, at which a dividend of 20 per cent. was adopted.

Tokyo Steel Co.—The Tokyo Steel Company has increased its capital to 3,000,000 yen from the former 1,500,000 yen, with a view to expanding its business.

Korea Industrial Co.—The Korea Industrial Company at its general meeting of shareholders, decided to increase its capital by 1,500,000 yen and adopted a dividend of 7 per cent. per annum.

Canton Insurance Office, Ltd.—The statement of the affairs made up to 31st December, 1912, states that it has been decided to abandon the system, hitherto in force, of closing the working account after eighteen months' working, and in future to keep it open for twenty-four months. The working account for the year 1912 would therefore be kept open until the 31st December, 1913.

Future annual meetings would be held as near to the end of April as possible.

1912 Account.—The amount standing to the credit of this account was $1,545,432.06.

Out of this the general agents and consulting committee declared an interim dividend of $18 per share, absorbing $180,000. The remainder of $1,365,432.06 was carried forward to be dealt with at the next ordinary meeting.

Nisshin Steamship Co.—At a general meeting of the Nisshin (Japan and China) steamship company a dividend of eight per cent. will be declared.

Manila Hotel Co.—The Manila Hotel Company was been authorized to increase it capital stock from P.400,000 to P.500,000, and to raise its bonded indebtedness from P.800,000 to a million pesos.

New Philippines Incorporations.—"La Basconia" a new corporation recently organized in Iloilo for the purpose of engaging in the sugar industry, starts with a capital of P.400,000, divided into 400 shares at a par value of P.1,000 each. Of this amount P.134,000 has been subscribed and paid up.

The following have been Incorporated:—The Massachusetts Plantation Co., the Philippine Abacá Co. and the Manobo Cocoanut Co. All four companies will have headquarters in Manila. The Massachusetts Plantation Co. will engage in general plantation development. The Philippine Abacá Co. will devote itself principally to the abacá industry, and the Manobo Cocoanut Co. will engage principally in cocoanut planting. Each company has a capital stock of P.50.000 divided into 500 shares at P.100 each, and in the case of each corporation P.10,000 has been subscribed and P.2,500 paid up.

Hotel de France, Manila.—The hotel made a profit for the year ended December 31, 1912 of P27,776.57. A dividend of 9 per cent., absorbing P9,000 was declared; P14,344 placed to depreciation; P3,700 added to bad debt reserve fund and P642.57 carried forward.

Antung Saw Mill Co.—The Antung Saw Mill Co. during last year made a total profit of Y.7,483, which was distributed as follows:—

Legal reserve	Y 500
Special reserve	1,500
Depreciation fund for buildings, furniture, etc.	1,000
Initial expenses	1,000
Bonus to officers	500
Carried forward to next term	2,983
Total..	7,483

Hall and Holtz, Limited (Shanghai).—The Report of the Directors for the year ended February 28, 1913 states that the profit for the year, including $12,858.32 brought forward from last year, amounts to $68,475.11, which the Directors recommended should be disposed of as follows:—A Dividend of $2.00 per share

(10%)	$52,676.00
Carry forward to new account	15,799.11
	$68,475.11

Siam Steam Packet Co., Ltd.—The report for the year ended December 31, 1912 stated that the profits amounted to Ticals 20,102.34. To this had to be added Ticals 1,630.97 brought forward from last year, making a total of Ticals 21,733.31. From this sum the Directors wrote off Ticals 21,157.61 as Depreciation on Launches and Property and carried the balance of Ticals 575.70 forward to 1913.

Bangkok Dock Co.—The report for the year ended December 31, 1912 stated that, after paying interest on Debentures, making provision for all bad debts, writing off Ticals 33,184.80 as depreciation on the company's property and plant, the nett profit amounted to Ticals 84,113.38. To this had to be added amount brought forward from last year Ticals 2,635.61, which made a sum of Ticals 86,748.99 available for distribution, which it was proposed to allot as follows:—

Transfer to Dividend Account 7 per cent.	Ticals	70,000.00
Remuneration to Directors	„	7,150.00
Bonus to Staff	„	5,000.00
Carry forward to 1913	„	4,598.19
	Ticals	86,748.99

PERSONAL

Mons. Ardain, the director of the Bank de d'Indo-Chine at Shanghai, has gone to France on leave.

H.E. Mons. M. Batalha de Freitas, the new Portuguese minister to Peking, arrived at the Chinese capital in May.

The new British *Chargé d'Affaires* Mr. F. Beilby Ashton, has arrived at Peking from London, and was to take over charge of the British Legation on June 6th, when H.E. Sir John Jordan was to go home on leave.

Herr Rump, the recently appointed chief auditor of the Chinese Government for the new Loan expenditure, has taken up his residence at Peking.

Mr. Tetsutaro Aoki, who has been the Japanese commercial agent abroad, has been nominated a director in the Industrial Bank of Japan, succeeding Mr. Jutaro Iwai, who resigned.

Mr. A. R. Linton, manager of the Mercantile Bank at Singapore, has been appointed to Hongkong to fill the place of Mr. F. C. Macdonald, who is going to Ceylon.

The Hon. Mr. C. H. Ross, who succeeded Mr. Henry Keswick about three years ago as head of the firm of Messrs. Jardine, Matheson & Co., Ltd., in China, left for Home on May 6th, and will henceforth remain at the firm's London office. Mr. David Landale has assumed charge at Hongkong for Messrs. Jardine, Matheson and Company, Ltd.

Dr. Seijiro Hirai, Vice-President of the Imperial Japanese Railway Board, has been appointed an adviser to the Chinese Board of Communications.

The King of Spain has decorated Mr. S. Kunisawa, Vice-President of the South Manchuria Railway and Dr. Uyeda, private secretary to the President, in appreciation of the courtesies offered by them to H. R. H. Prince Don Alphonso de Orleans Bourbon when His Royal Highness travelled through South Manchuria last summer.

It is reported that President Wilson has selected as American Ambassador at Tokyo, Mr. George W. Guthrie. Mr. Guthrie is a Pittsburg man, being born in that city in 1848, and is a greduate of the Pittsburg University. He is a lawyer by profession, and, of course a Democrat in politics. He was a delegate to the Democratic National Covention in 1904, and later became Mayor of his native city, during his holding of which office he achieved some fame as a drastic reformer. Mrs. Guthrie was formerly Miss Florence J. Howe, also of Pittsburg.

Last year Mr. Yamada Boku, a director of the Nippon Cotton Company, of Osaka, Japan was appointed a broker on the New York Cotton Exchange, on behalf of his company. Mr. Seko Konosuke, manager of the New York branch of the Mitsui Bussan, has also been appointed a broker on the exchange, on behalf of his firm.

Mr. J. W. Burtwell, manager of Dodwell & Co., at Hankow, has gone to England on furlough. Mr. Burtwell acted as adjutant to the British Volunteer Corps for some time. During his absence Mr. G. G. Franklin will carry out the duties.

M. A. J. Pernotte, manager of the Tientsin branch of the Banque de l'Indo-Chine, has gone to Peking to take up the post of manager of the new Franco-Chinese Bank.

At St. John's Cathedral, Hongkong, the marriage was solemnized of Major Austen Morgan Rotheram, and Miss Violet Montague Ede, only daughter of the Hon. Mr. C. Montague, and Mrs. Ede of Hongkong.

Several changes have been made recently in the Customs staffs at river ports. Mr. A. H. Wilzer, Commissioner at Ichang, has been transferred to the Inspectorate at Peking; Mr. A. W. Cros of the Shanghai staff, goes to Ichang as Commissioner, and Mr. Wade leaves Kirin to be Acting Commissioner at Changsha.

Mr. J. A. Harmsen and Mr. F. H. Bugbird have been elected Chairman and Vice-Chairman respectively of the Yokohama Foreign Board of Trade

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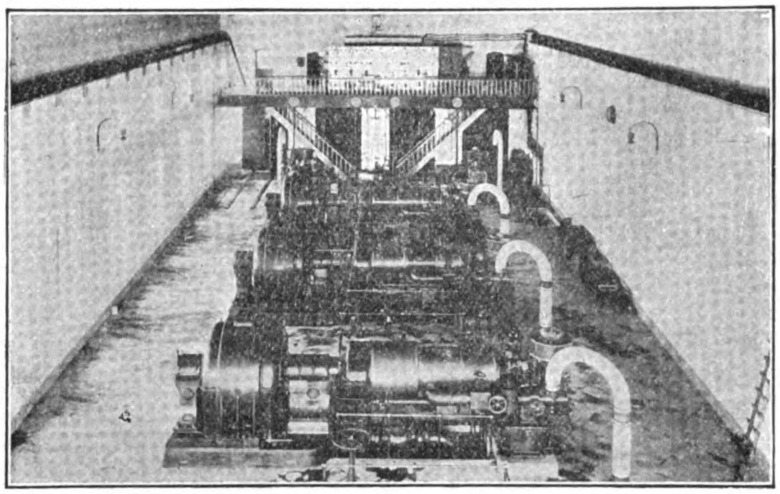

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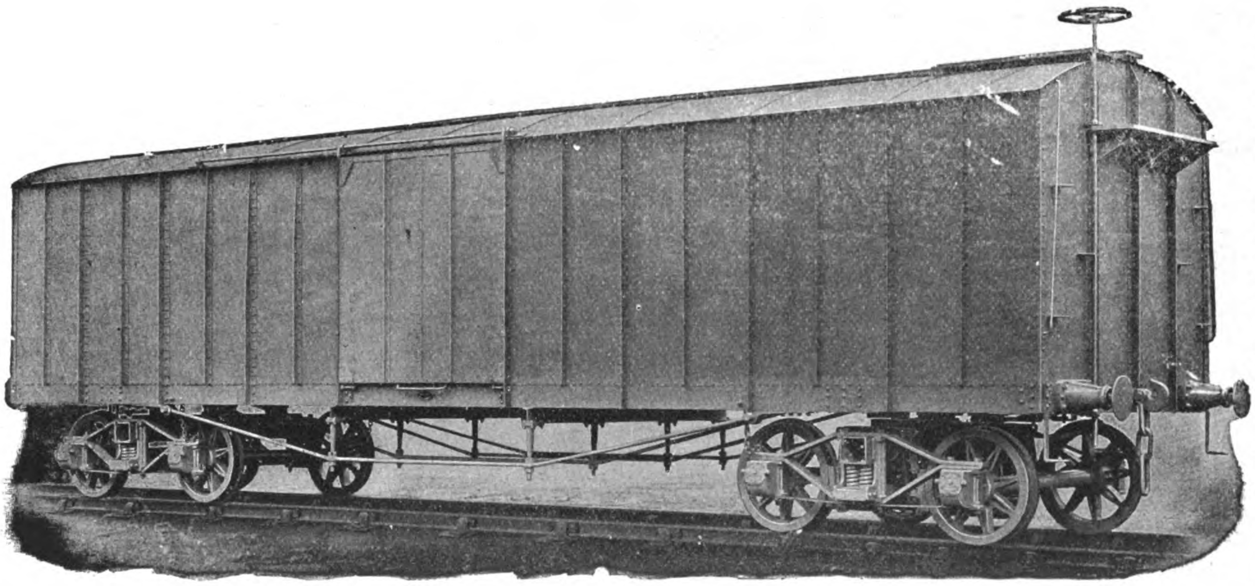

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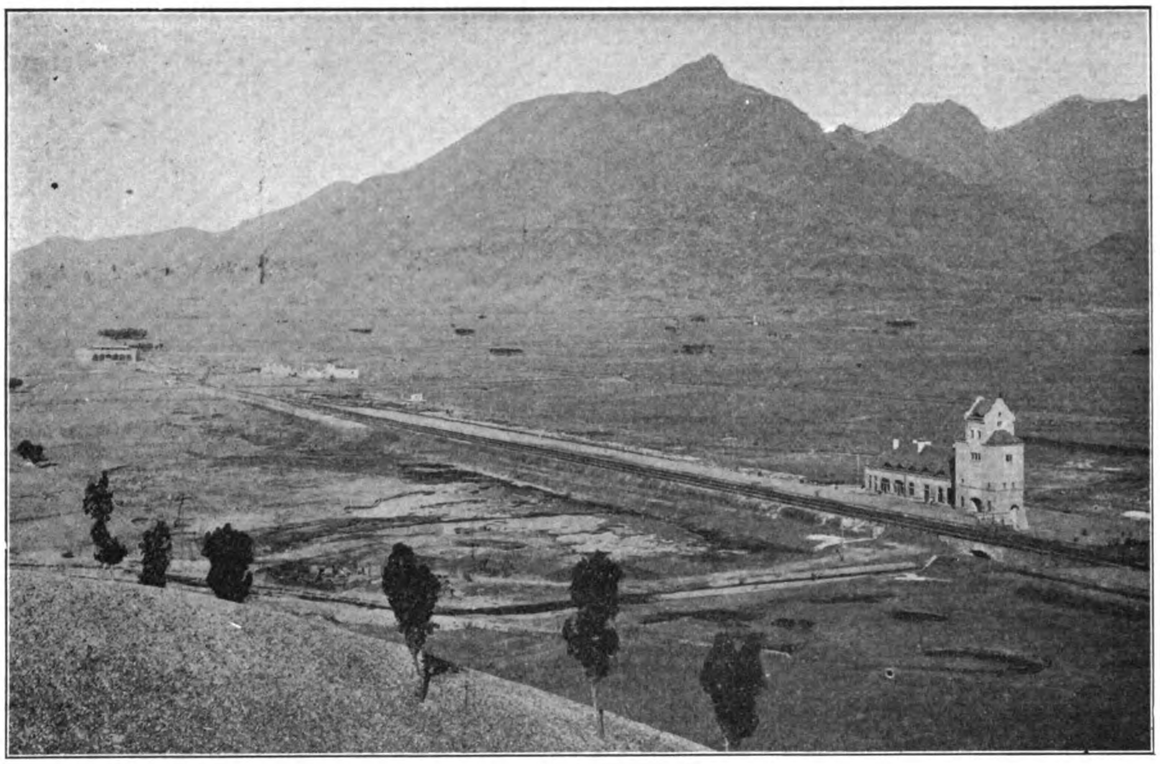

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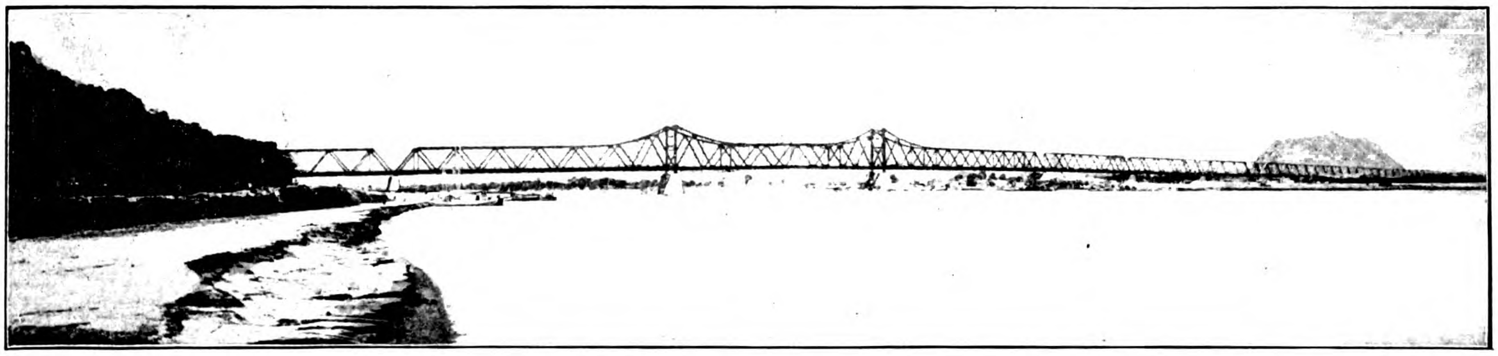

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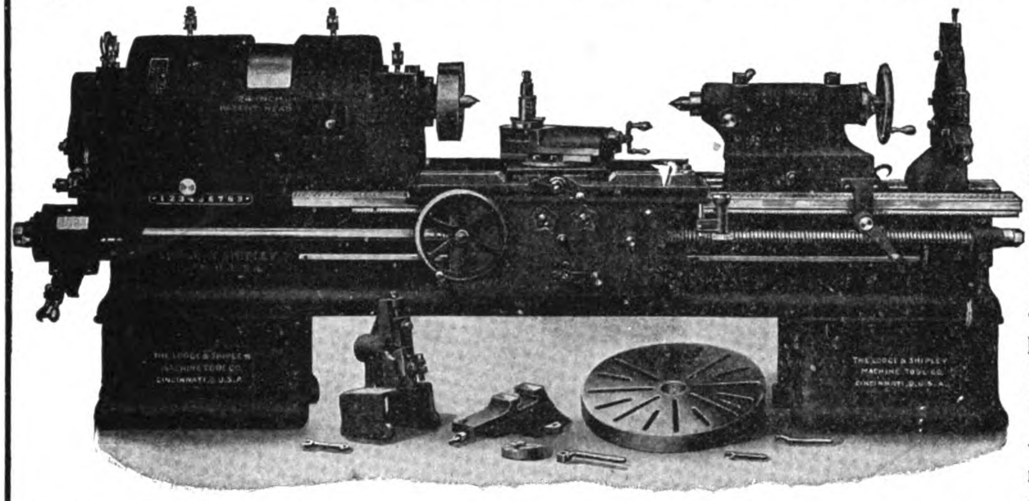

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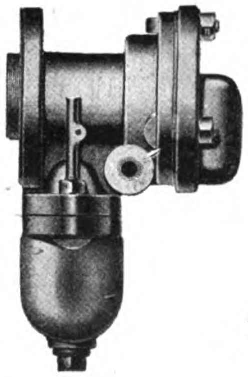

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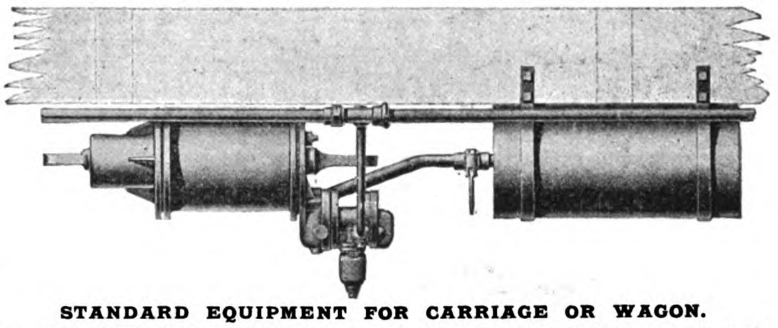

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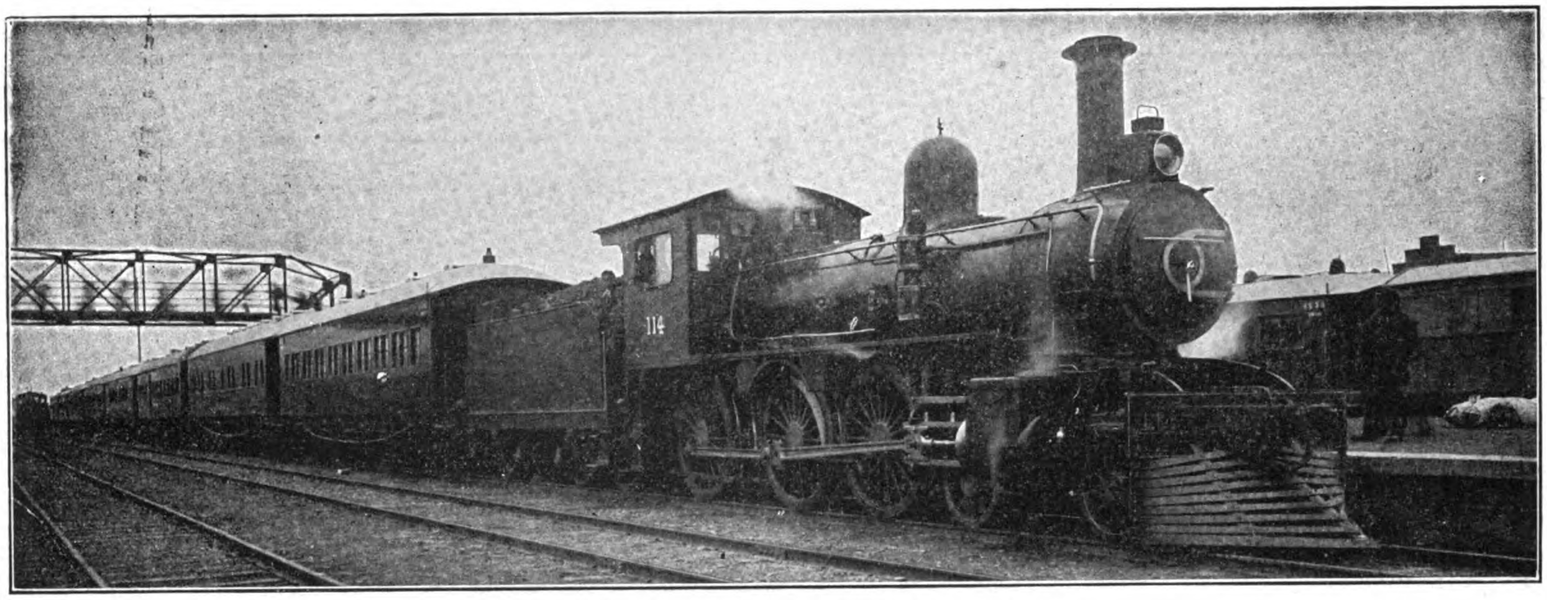

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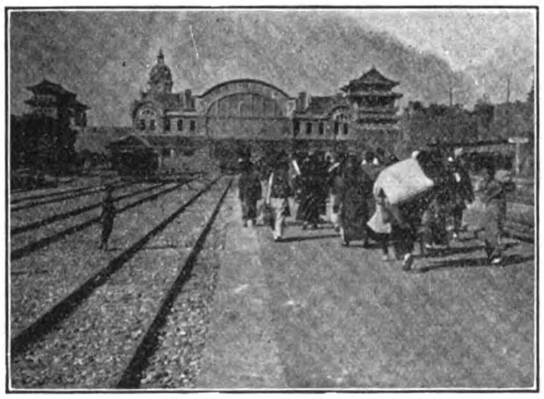

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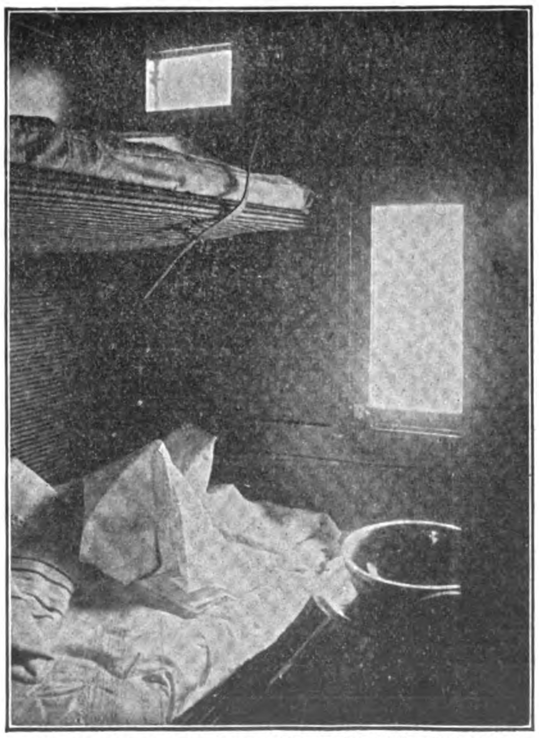

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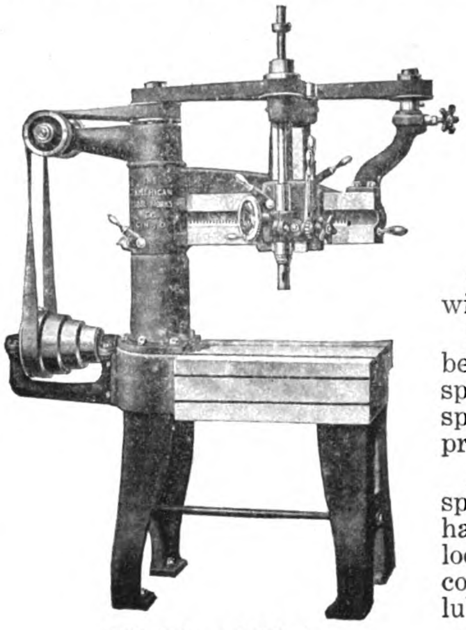

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There are absolutely no driving gears in this drill, it being driven by a 2″ double belt running at a high rate of speed, thus transmitting an abundance of power and speed direct to the spindle. The spindle belt is kept at proper tension by turning the star knob shown at the top.

All the driving and idler pulleys are equipped with our special ball bearings, which consist of a double set of hardened and ground ball races and cones, one set being located at each end of the pulley journals. They are so constructed as to be dust proof and form a retainer for the lubricant which needs to be renewed only at long intervals.

This drill will increase your output.

The American Tool Works Company

Lathes : Planers Cincinnati, U. S. A. Shapers : Radial Drills

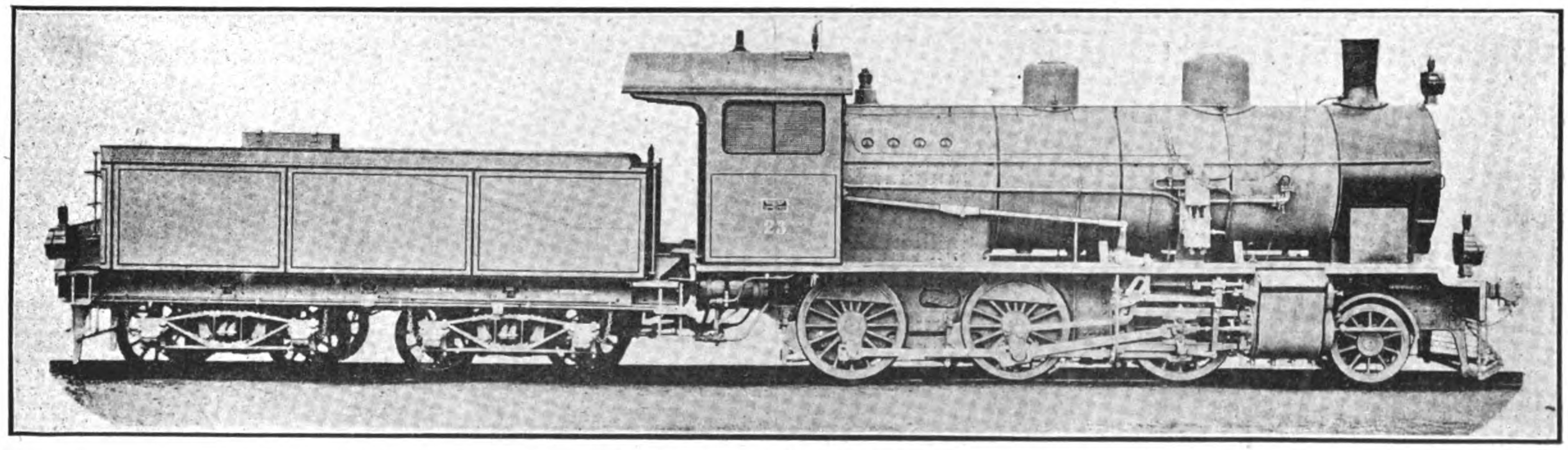
BERLINER MASCHINENBAU, A.G.

(ESTABLISHED, 1852) LATE L. SCHWARTZKOPFF (3,500 WORKMEN)

BERLIN, N. 4.

LOCOMOTIVES

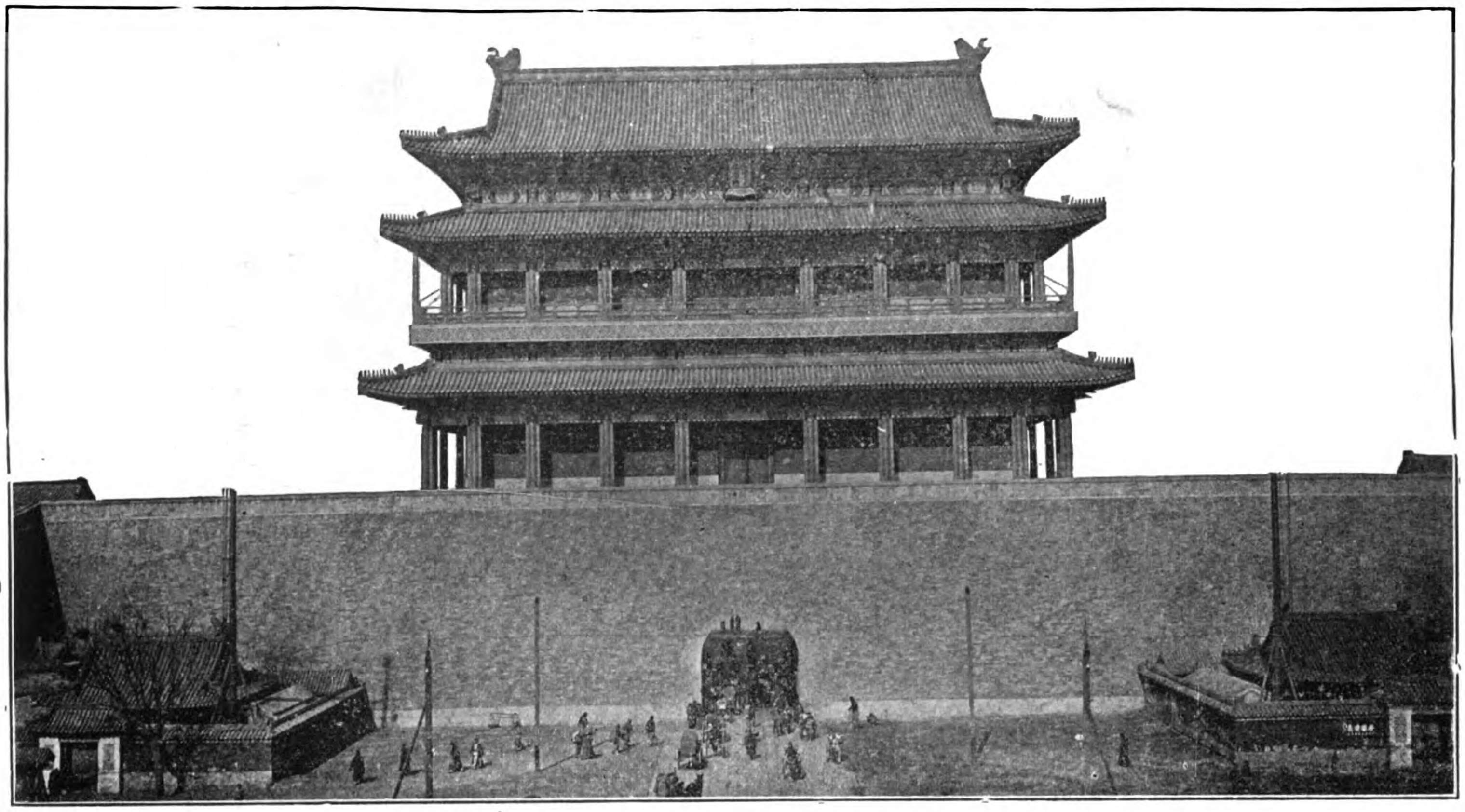
of every Description, Especially with Superheaters



REPRESENTATIVES

CENTRAL AND SOUTH CHINA MELCHERS & Co., SHANGHAI

NORTH CHINA BIELFELD & SUN, TIENTSIN



THE CHIEN MEN GATE, PEKING, TERMINUS OF THE PEKING-HANKOW LINE

CHINESE GOVERNMENT RAILWAYS

PEKING-HANKOW LINE

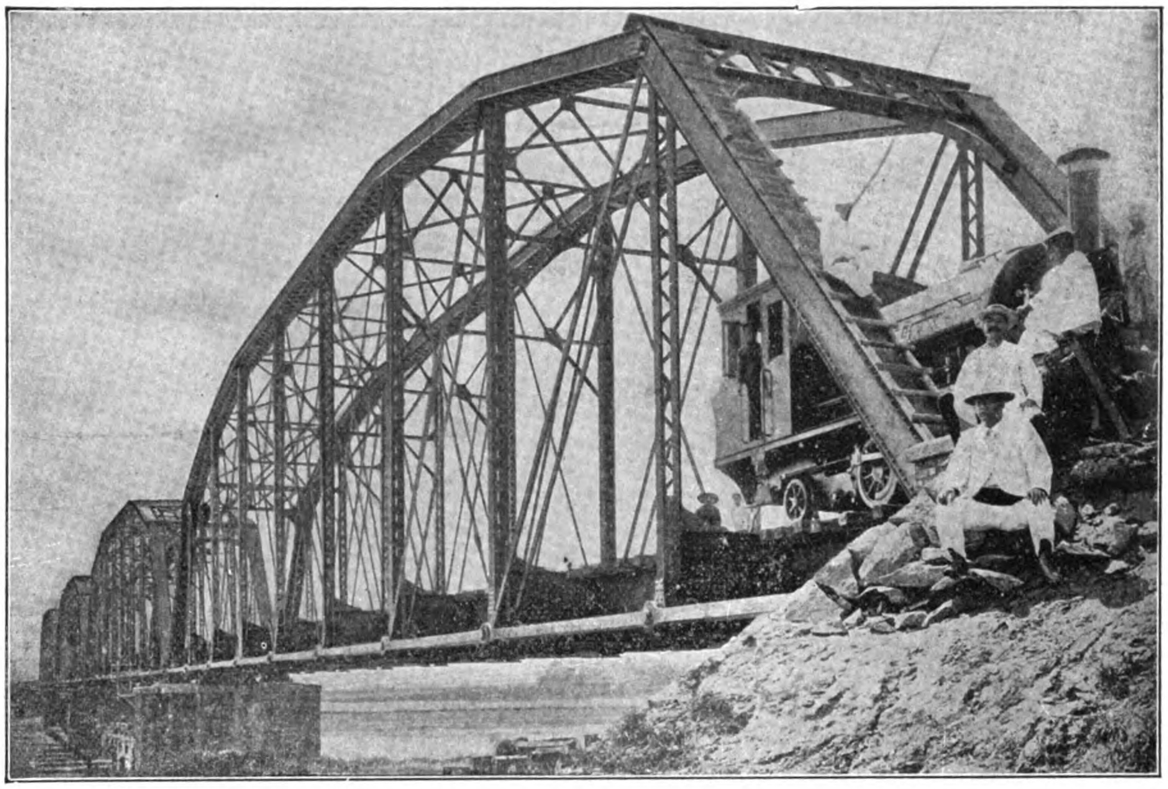
"THE ROAD THROUGH THE HEART OF CHINA"

Avoid the Cold and Rough Weather in the Sea Trip between Shanghai and the North by the more comfortable Route up the Yangtsze to Hankow, and from there via the Ching-Han Railway to Peking, where through connections for Europe are made with the Trains de Luxe of the Government Railways of North China.

This line passes through the Heart of the Country and enables the traveller to and from Europe to catch a glimpse of Old China. Ancient walled cities, temples and pagodas are seen from the comfortable seats of the weekly trains de luxe operated by this line. From Peking, the great capital of the oldest civilization in the world, the train departs from the famous Chien-Men and carries the traveller through the historical and legendary portions of the Country, to the modern industrial center at Hankow—the Chicago of China. Connections are made with the Cheng-Tai Railway at Chengtingfu, with the Tao-Ching Line at Sin Siang-sien, and at Chengchowfu with the Pienlo Line.

A weekly express train de luxe leaves Peking every Tuesday, and Hankow every Friday, making the trip of over 700 miles in less than thirty hours.

For information apply to any office of the International Sleeping Car Co. or Thos. Cook and Sons.



4-200 foot spans, Taiwan Railway, near Taipeh City, Formosa, Weight 600 tons

UNITED STATES STEEL PRODUCTS CO.

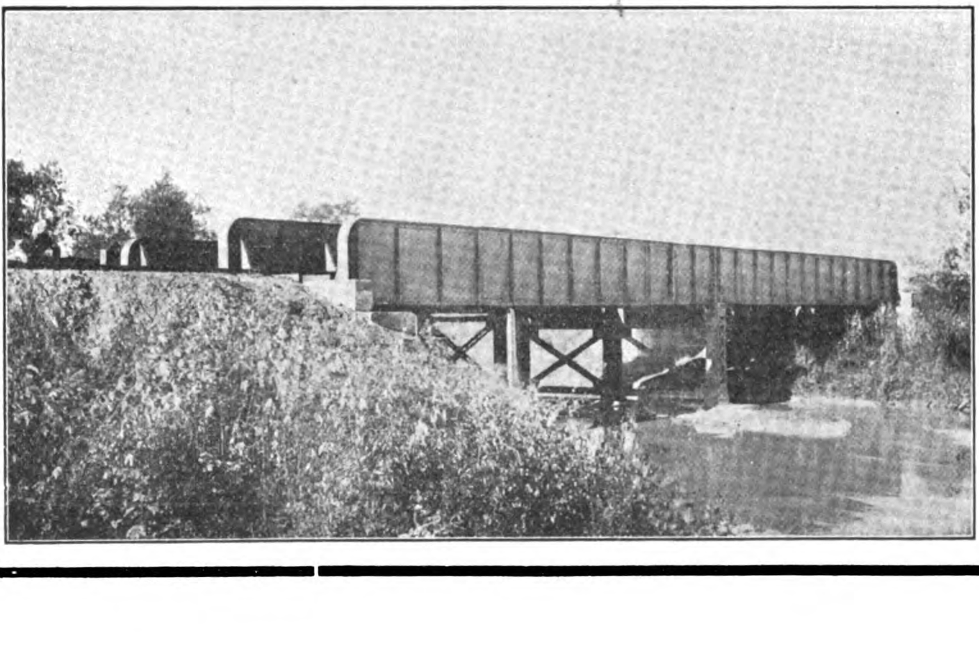
24a KIANGSE ROAD, SHANGHAI :-: Telegraphic Address: "STEELYARD" SHANGHAI

Exporters of the Products of

THE AMERICAN BRIDGE COMPANY OF NEW YORK

DESIGNERS AND BUILDERS OF ALL CLASSES OF METALLIC STRUCTURES

Bridges	Buildings	Tanks
Viaducts	Towers	Rivetted Pipe



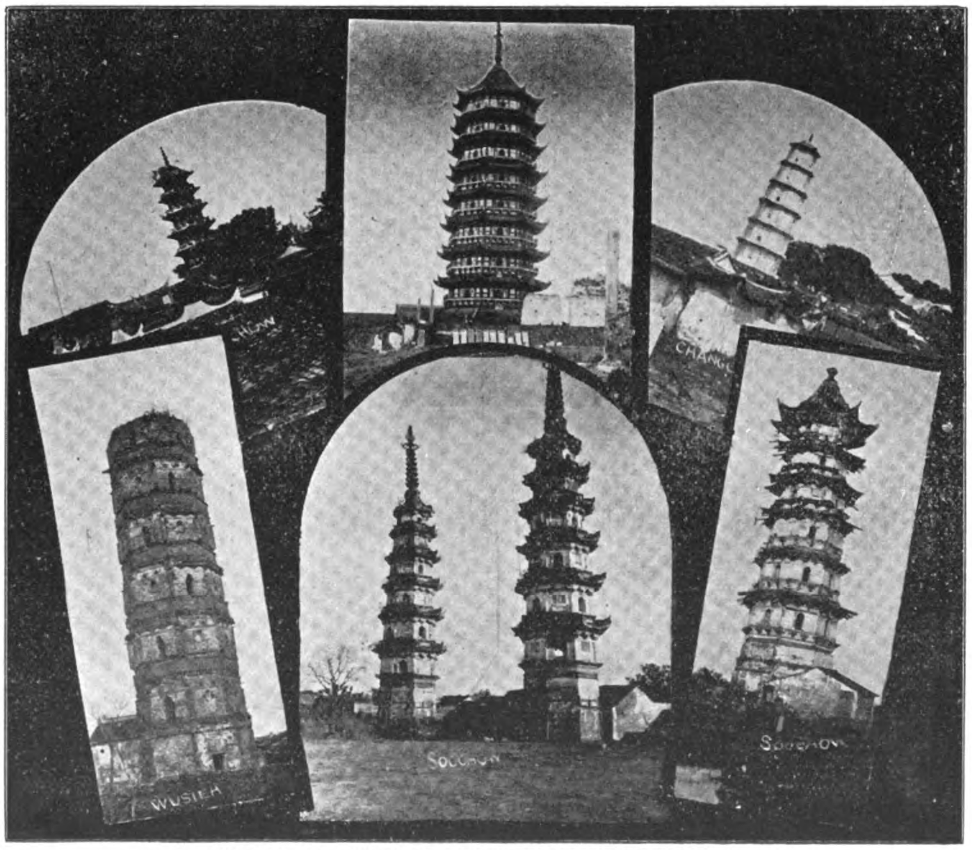
The Line of A Hundred Pagodas

THREE EXPRESS SERVICES DAILY, WITH RESTAURANT AND SLEEPING CARS

BETWEEN

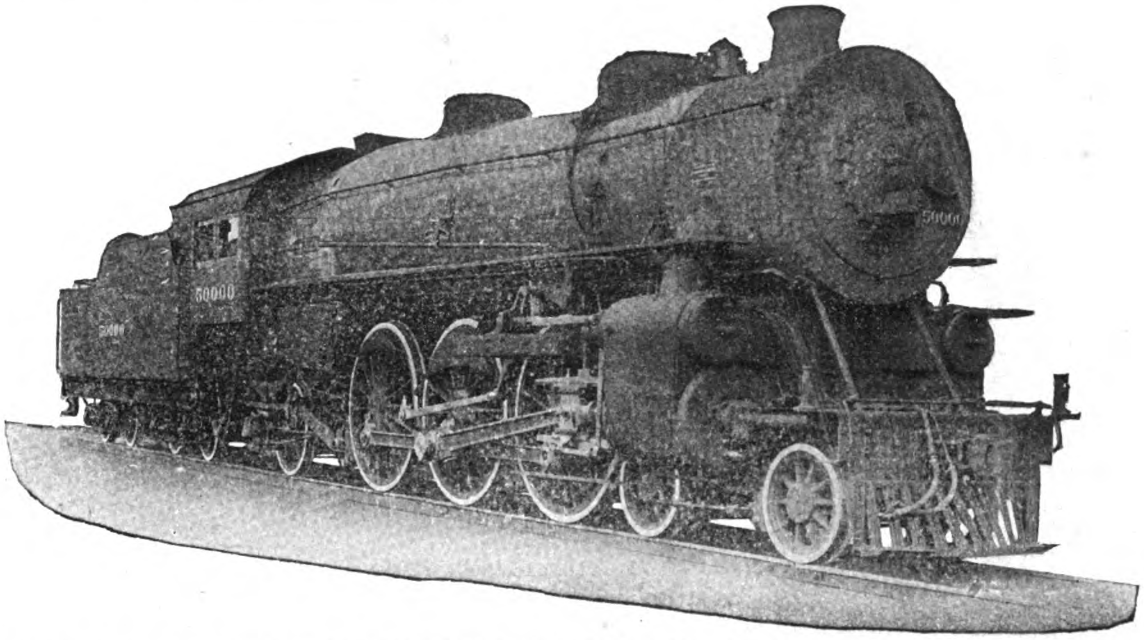
SHANGHAI, SOOCHOW, WUSIH, CHANGCHOW, CHINKIANG AND NANKING

SEE THE NANKING BATTLE-FIELDS



SOME OF THE PAGODAS ALONG THE LINE OF THE S. N. R.

DELIGHTFUL WEEK END EXCURSIONS



EXPERIMENTAL PACIFIC TYPE LOCOMOTIVE, BUILT BY AMERICAN LOCOMOTIVE COMPANY
Tractive Power 40,800 Pounds; Cylinders 27 x 28 Inches; Total Weight on Drivers 172,500 Pounds.

This locomotive was designed and built by the American Locomotive Company at its own expense for the purpose of developing maximum capacity for minimum weight. In service tests it has already shown economy in excess of 25 per cent. over one of conventional design and of equal weight.

FUEL ECONOMY MEANS
MORE POWER AT THE DRAW BAR
WITH THE SAME LABOR AT THE FIRE DOOR

Do you realize that 25 per cent. saving in fuel to do the same work means 33 per cent. increased capacity? This 25 per cent. in fuel economy is available through good detail design, proper selection of proportions and the use of fuel saving devices.

You may not wish to save the 25 per cent. in fuel. You may desire to use the saving in another way. If you burn the same amount of fuel as before the 25 per cent. economy will become 33 per cent. increased capacity. This means a larger locomotive with the latest and best improvements in design.

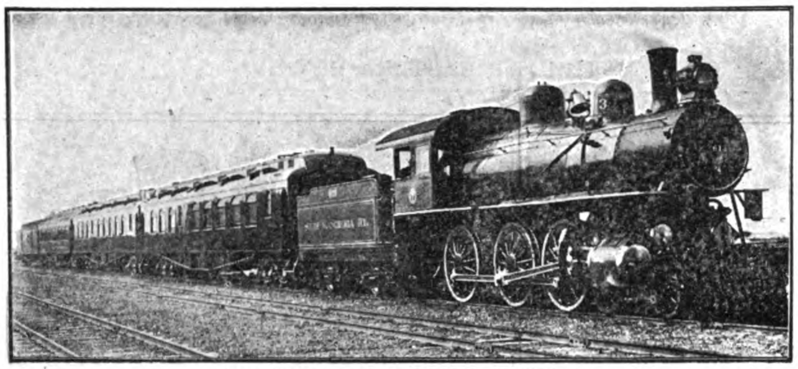
Economy in fuel means that every pound can be made to do more work. This means more ton-miles per ton of coal.

AMERICAN LOCOMOTIVE COMPANY
30, CHURCH STREET, NEW YORK. Cable Address:—LOCOMOTIVE NEW YORK

MITSUI BUSSAN KAISHA, LIMITED
(MITSUI AND COMPANY)

Sole Agents for China, Japan, Korea, Manchuria and Siam
Agents for the Philippine Islands, Pacific Commercial Co., Manila

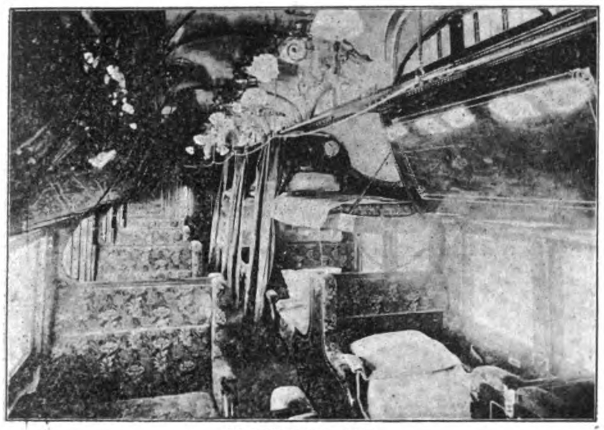
SHORTEST, QUICKEST, AND CHEAPEST ROUTE BETWEEN THE FAR EAST AND EUROPE



THE SOUTH MANCHURIA EXPRESS

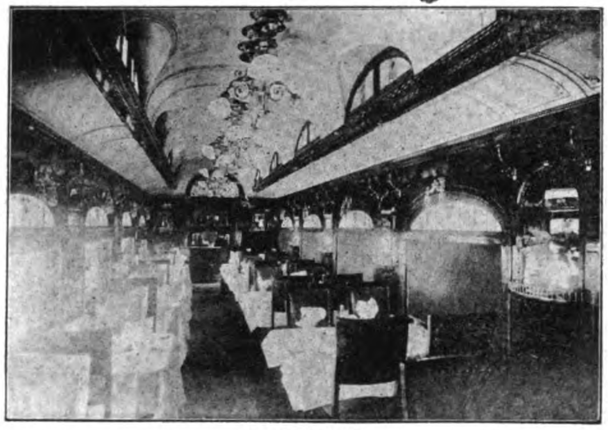
Shanghai	to	London	in	13½ days
Tokio	„	„	„	13¼ „
„	„	Peking	„	3½ „
Dairen	„	Moscow	„	8¾ „

South Manchuria Railway



SLEEPING CAR

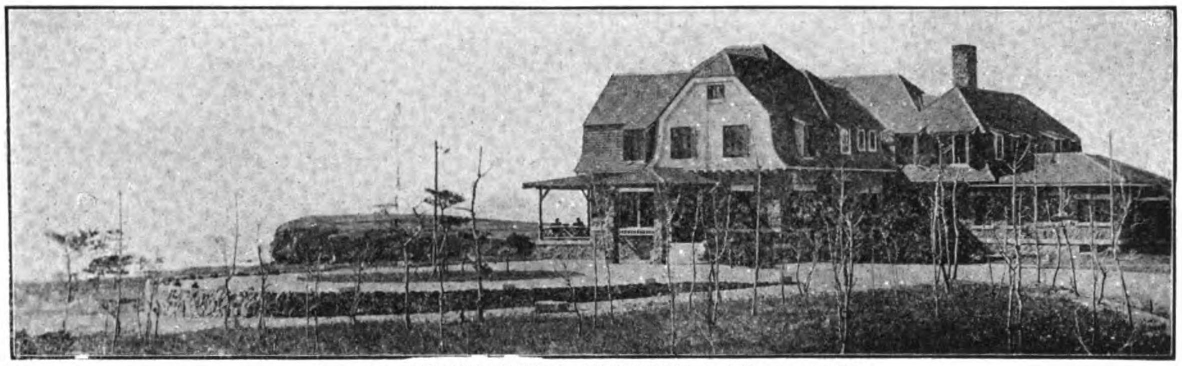
THRICE WEEKLY EXPRESS TRAINS.—Composed of excellently equipped SLEEPING, DINING, and 1st CLASS CARS. Operated between DAIREN and CHANGCHUN in connection with the TRANS-SIBERIAN ROUTE and SHANGHAI MAIL STEAMERS.



DINING CAR

CONNECTIONS AT MUKDEN.—These Express Trains connect at MUKDEN with the PEKING-MUKDEN RAILWAY running via TIENTSIN and with the newly organized MANCHURIA-CHOSEN THRICE WEEKLY EXPRESS SERVICE between Changchun and Fusan; the MUKDEN-ANTUNG LINE (now running throughout on standard gauge) connecting with the KOREAN RAILWAY; by this route the journey between Europe and Japan is shortened by two days, and the sea voyage considerably reduced.

OTHER STEAMER CONNECTIONS AT DAIREN.—Regular Steamship Services are maintained from DAIREN to MOJI, KOBE, CHEMULPO, TIENTSIN, CHEFOO, TSINGTAU, and other ports in Japan and China.

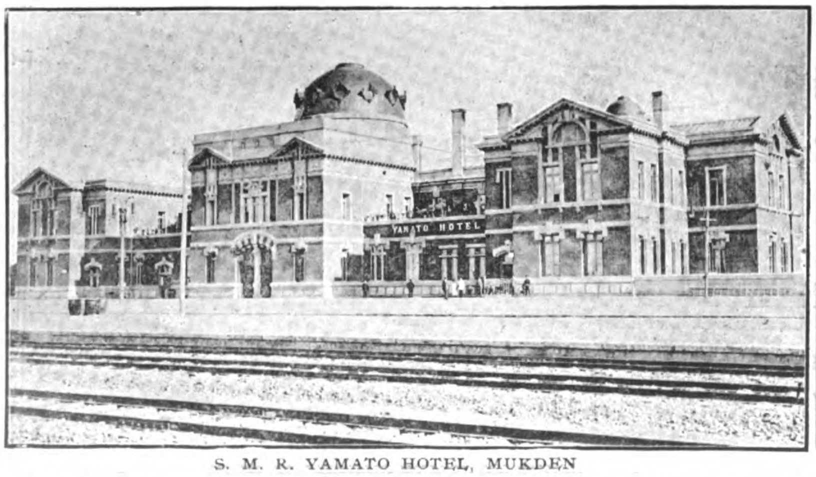


S. M. R. YAMATO HOTEL HOSHIGAURA (STAR BEACH)

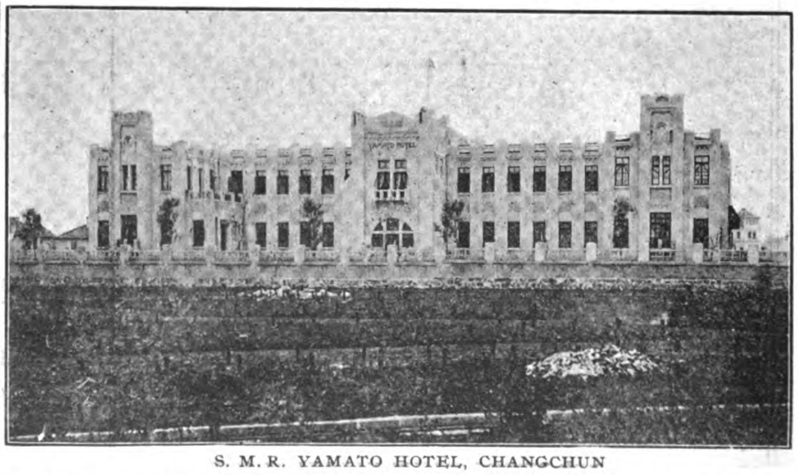
RAILWAY HOTELS.—YAMATO HOTEL (Tel. Add.: "Yamato") at DAIREN, PORT ARTHUR, MUKDEN, CHANGCHUN, and HOSHIGAURA, all managed by the Company on European lines and providing comfortable accommodation.

At Hoshigaura ("Star Beach"), the finest seaside resort in North China, 5 miles from Dairen, in addition to the hotel, there is a large number of bungalows (for hire at moderate terms), situated in a charming cliff garden and surrounded by beautiful scenery.

TICKET AGENTS IN EUROPE AND THE FAR EAST.—The INTERNATIONAL SLEEPING CAR & EXPRESS TRAINS CO.; The NIPPON YUSEN KAISHA, Shanghai; Messrs. THOS. COOK & SON; the REISEBUREAU DER HAMBURG-AMERIKA LINIE: and the NORDISK RESEBUREU. Time-tables, fares, literature, and any information can be obtained gratis upon application to the Traffic Department.



S. M. R. YAMATO HOTEL, MUKDEN



S. M. R. YAMATO HOTEL, CHANGCHUN

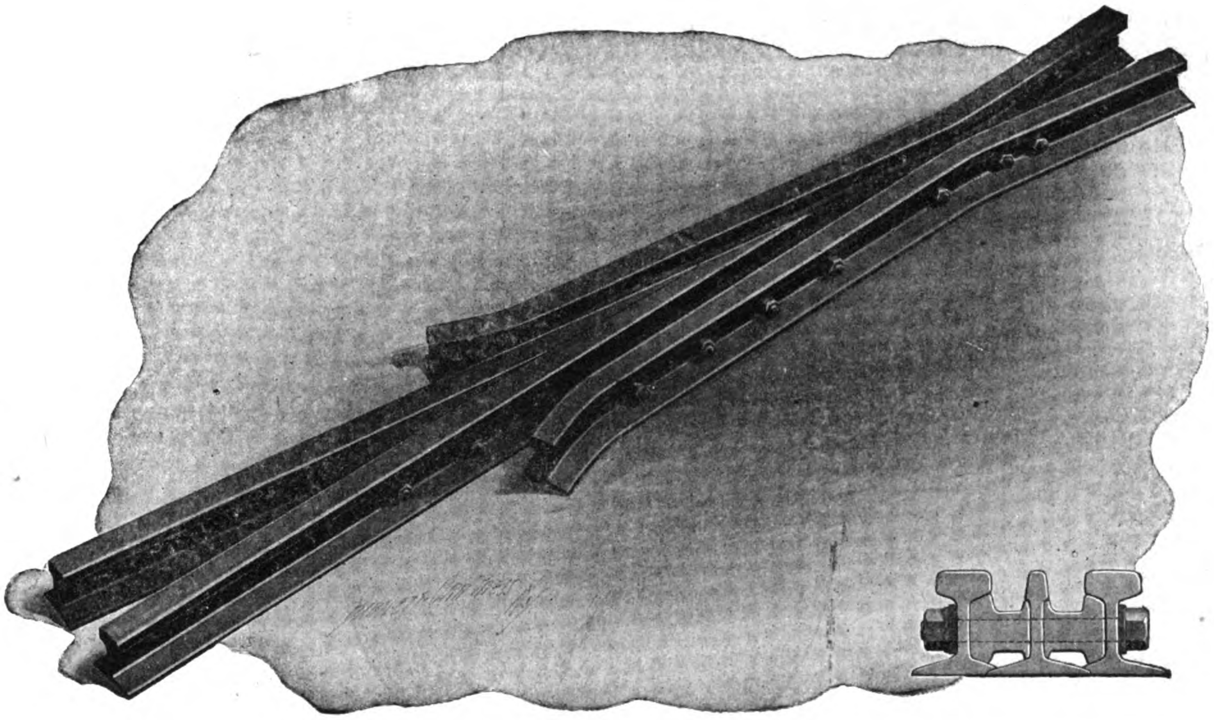
SOUTH MANCHURIA RAILWAY COMPANY, DAIREN, MANCHURIA

Tel. Add.: "MANTETSU" -:- Codes: A. B. C. 5th Ed., A-1, and Lieber's

CARNEGIE STEEL COMPANY

ILLINOIS STEEL COMPANY

Manufacturers of Bessemer and Open Hearth Steel



BEAMS
CHANNELS
ANGLES
TEES
ZEES
PLATES
BARS
CARNEGIE "X"
COTTON TIES
HOOPS

RAILS, Light & Heavy
FISHPLATES, Bolts & Nuts
SPIKES, TIE PLATES
Steel Ties and Fastenings for Both
Portable and Heavy Track
Continuous Joints
DUQUESNE JOINTS

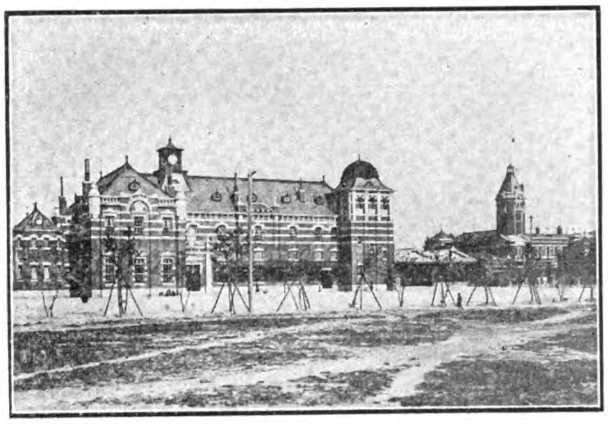
STEEL SHEET PILING
STEEL WHEELS FOR
STEAM RAILROADS
AND TRAMWAYS
STEEL MINE TIMBERS
STEEL OIL DERRICKS
AXLES
ARCH BARS
FORGINGS
ARMOR PLATE

REPRESENTED BY

The United States Steel Products Company

24A KIANGSE ROAD, SHANGHAI

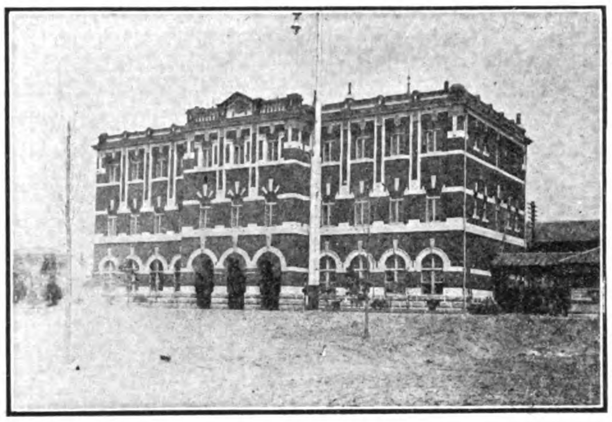
Chosen (Korean) Railway



FUSAN STATION

TO KEIJO

From Tokyo	45	hours
,, Mukden	20	,,
,, Harbin	33	,,
,, Moscow	9	days
,, Berlin	10	,,
,, Paris and ,, London	11	,,



SHINGISHU STATION

THE CHOSEN (KOREAN) RAILWAY

The Chosen Railway affords the travellers every opportunity to study the conditions and country of Chosen in addition to the enjoyment of interesting sights and scenes along the routes.

Express Trains

FUSAN-CHANGCHUN

Chosen-Manchuria Express Service

(*944 miles, 33 hours*)

The Chosen-Manchuria Express Train which takes excellently equipped sleeping, dining and 1st class cars is run thrice a week between the two points in connection with trains for Europe via the Changchun - Harbin Section of the Chinese Eastern Railway.

A STREET IN SEOUL

Express Trains

FUSAN-ANTUNG

(*584 miles, 21 hours*)

Through express trains to which cars of all classes (1st, 2nd and 3rd) and sleeping cars for 1st class passengers only are attached, are run once a day in each direction. European meals are obtainable on the trains.

FUSAN-KEIJO (SEOUL)

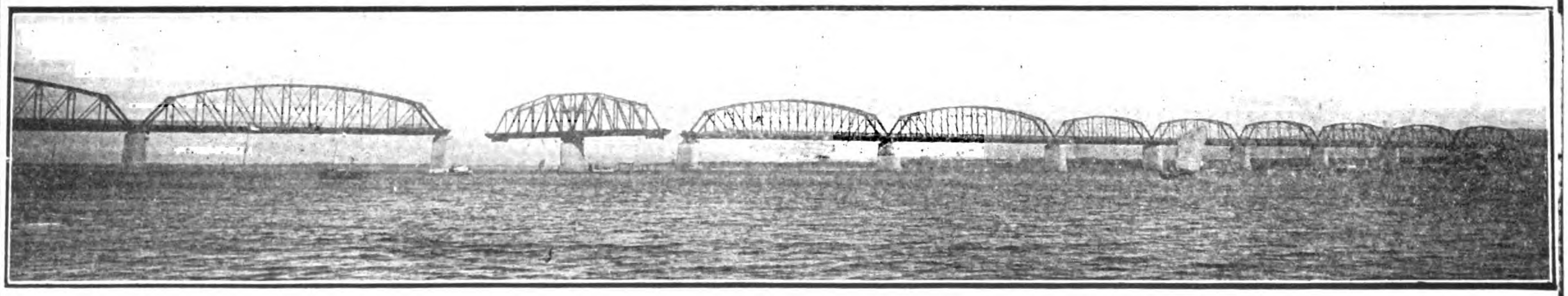
(*275 miles, 11 hours*)

Express trains for which passengers of all classes are booked and dining cars are provided, are run once a day from each end.

The Shortest Sea Route on a Overland Journey between Europe and Japan.—(Only 120 nautical miles, about 10 hours). The ferry service between Fusan and Shimonoseki is maintained twice a day by the Imperial Japanese Government Railways' steamers fitted with every up-to-date appliance for the comfort and safety of tourists.

Station Hotels.—At Fusan and Shingishu, the two terminii of the Chosen Railways, modern European station hotels are provided for the benefit of tourists.

Ticket Agencies.—The International Sleeping Car & Express Trains Company and Messrs. Thos. Cook & Son.



THE RAILWAY BRIDGE OVER THE YALU RIVER

The Railway Bureau of the Government-General of Chosen

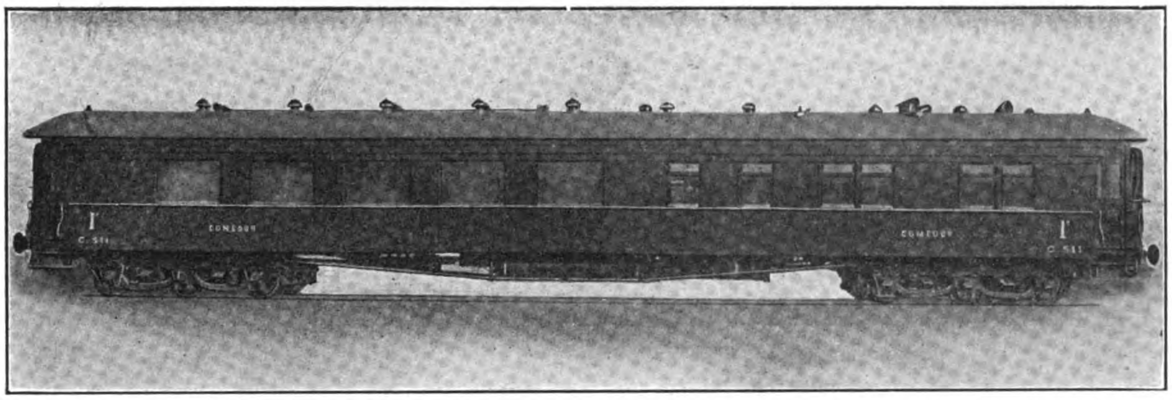
RYUZAN, CHOSEN (KOREA)

AMERICAN CAR & FOUNDRY COMPANY

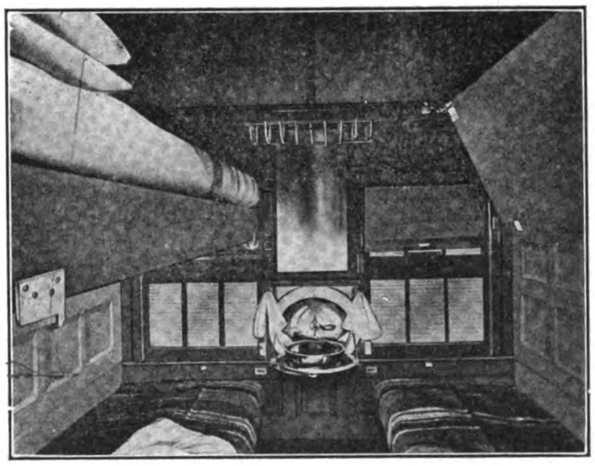
CHICAGO | General Offices 165 Broadway New York | ST. LOUIS

CAR BUILDERS

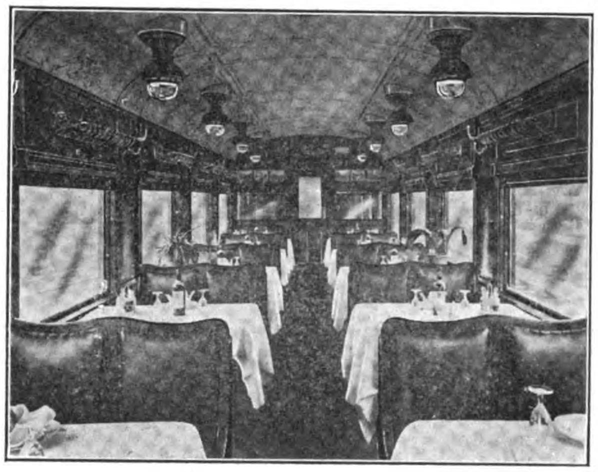
OUTPUT { 150,000 FREIGHT CARS
1,500 PASSENGER CARS
2,000,000 CAR WHEELS } PER ANNUM



TYPE OF SLEEPING AND DINING EQUIPMENT FOR ARGENTINE REPUBLIC
Gauge 5'-6" (1,676 M.) Body Length 70'- " (21,336 M.) Weight 98,000 lbs. (44,500 Kilos)



INTERIOR SLEEPING COMPARTMENT



INTERIOR DINING CAR

EXPORT REPRESENTATIVE

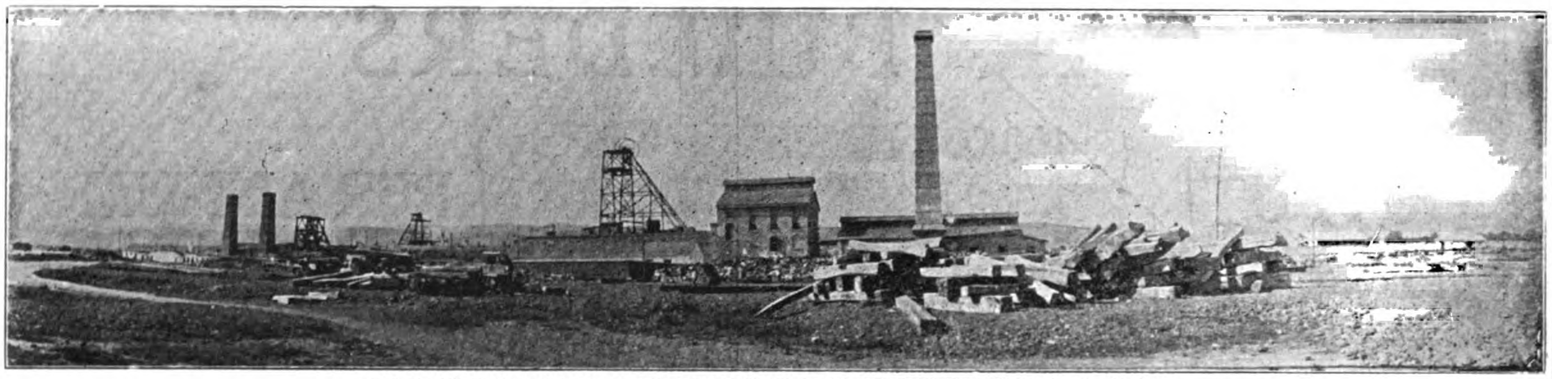
165 BROADWAY **DUTILH-SMITH, McMILLAN & COMPANY** NEW YORK

CHINESE GOVERNMENT RAILWAYS

THE TAO-CHING RAILWAY

TAOKOU TO CHINGHUA

(CHINESE GOVERNMENT HONAN LINE)



GENERAL VIEW OF COAL MINES ON THE LINE OF THE TAO CHING RAILWAY

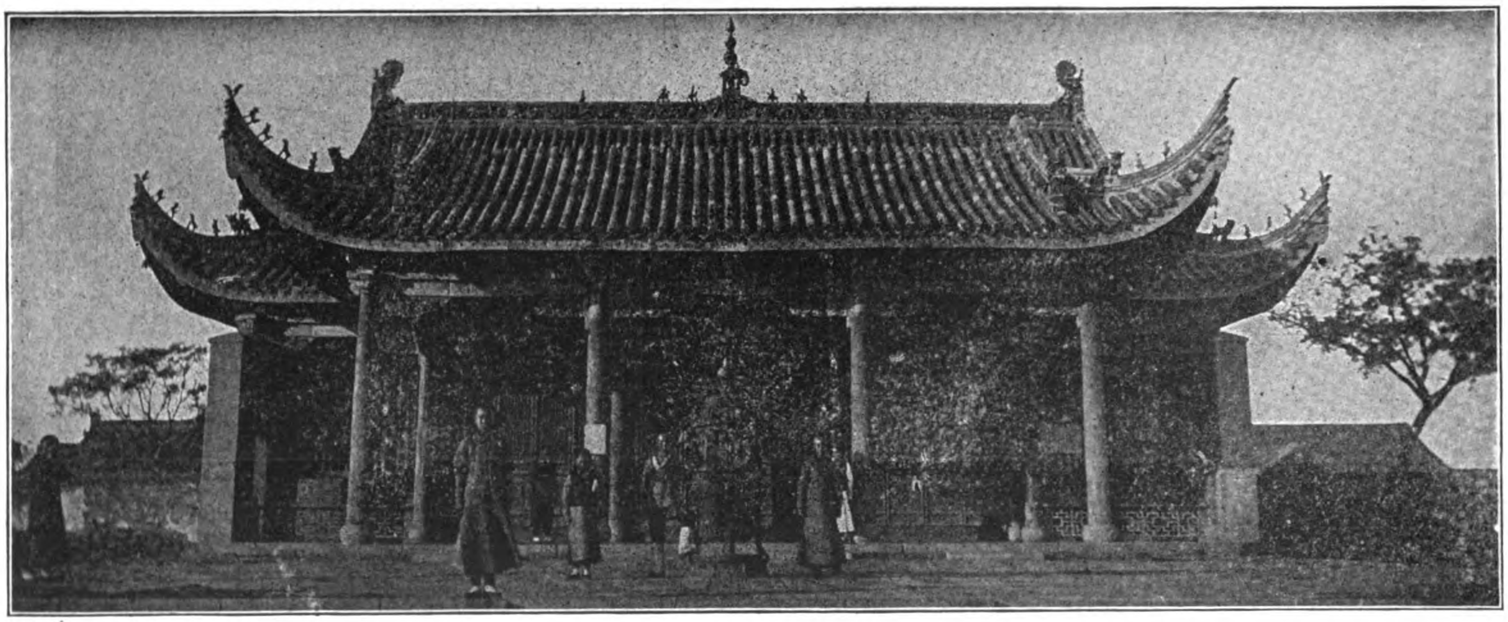
"China's Road of Anthracite"

THE TRAINS OF THIS LINE CONNECT AT SIN-SIANG-SIEN WITH THE THROUGH SERVICE OF THE PEKING-HANKOW RAILWAY. IT TAPS THE GREAT ANTHRACITE COAL DEPOSITS OF SHANSI, AND CONVEYS THE PRODUCTS OF THE MINES TO THE NEAREST NAVIGABLE RIVER.

THE PIENLO RAILWAY

(KAIFENG-FU TO HONAN-FU)

"THE FIRST SECTION OF THE PROJECTED CENTRAL TRUNKLINE"



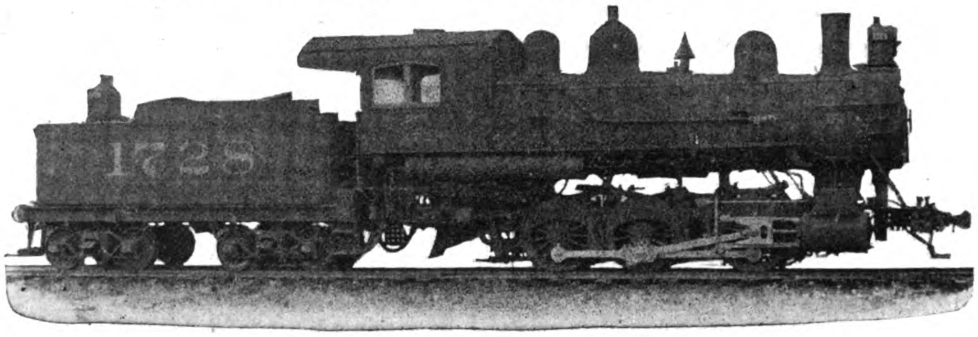
CHUNG-HUAN TEMPLE, KAIFENG-FU.

The line connects with the through service of the Peking-Hankow Railway at Tcheng Tchéou, enabling the traveller to visit Kaifengfu, the provincial capital of Honan, and the old capital of the Empire at Honanfu.

Lima Locomotives

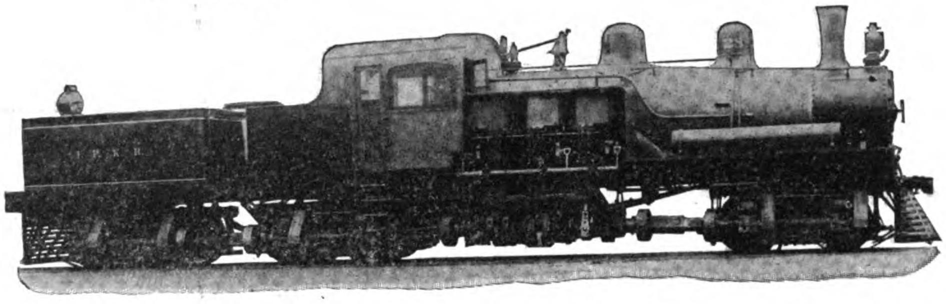
We Manufacture all Type and Sizes of Rod Locomotives as well as the Shay Geared

THE CUTS SHOWN BELOW, ILLUSTRATE LOCOMOTIVES RECENTLY CONSTRUCTED AT OUR PLANT.



One of 15-20×26″ 0-6-0-8 Switcher Type Locomotives recently furnished for the Southern Railway.

63″ E. W. T. Boiler. 32,063 Pounds Tractive Power.
185 Pound-Pressure. 4,500 Gallon-Tender.
51″ Drivers.



One of 3-100 ton Shay Geared Locomotives built for Chinese Government Peking Kalgan Railway, Peking, China.

60⅜″ E. W. T. Boiler. 3-15×″17″ Cylinders.
200 Pound-Pressure. 44,100 Pounds Tractive Power.

Our plant has recently been equipped with the latest and most improved machinery, which enables us to build any type or size direct connected locomotives, that your requirements may demand. We also build the well-known Shay Geared Locomotive in 18 different sizes, ranging in weight from the 10-ton up to 150-tons.

Write our agents or New York office for any information you may desire in this line, and for copy of catalog B.

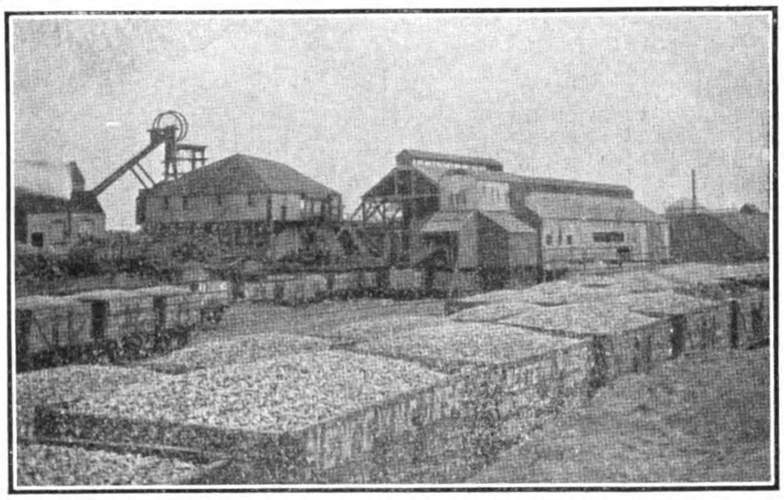
LIMA LOCOMOTIVE CORPORATION

1096 SOUTH MAIN STREET LIMA, OHIO, U.S.A.

AGENTS
SHEWAN-TOMES & CO.,
HONGKONG, CANTON, SHANGHAI, TIENTSIN, CHINA

BRANCH OFFICE
50 CHURCH STREET, NEW YORK, N. Y.
CABLE ADDRESS
SHAYLOCO

AGENTS
SAMUEL, SAMUEL & CO.,
YOKOHAMA, TOKYO, KOBE, SHIMONOSEKI, JAPAN; TAIPEH, FORMOSA



Telegrams: "Activity."

Western Valleys Anthracite Co.,

SWANSEA AND LLANELLY.

Producers of specially prepared

ANTHRACITE FOR GAS PRODUCER PLANTS.

CLEEVES & CO.,

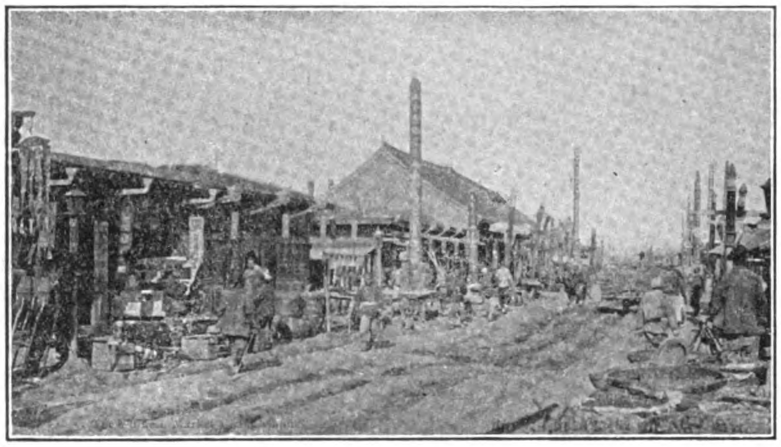
ANTHRACITE PROPRIETORS, 23, LIME ST., LONDON.

Code: A.B.C. 5th Edition. Telegrams: "Nudjoqui."

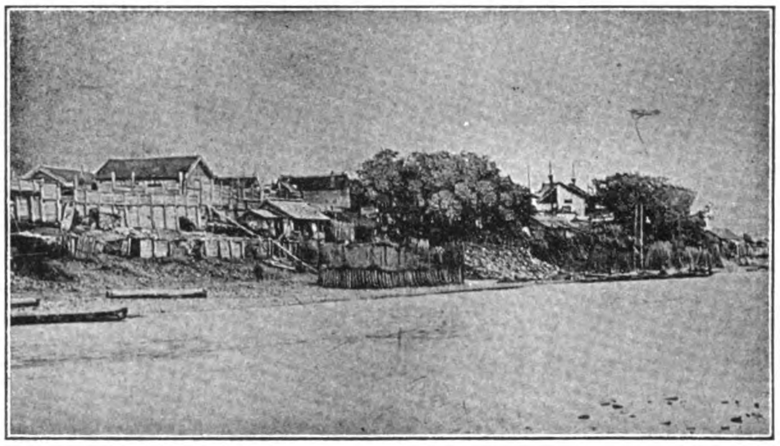
中華民國政府吉長鐵路行車時刻表

CHINESE GOVERNMENT RAILWAYS

KIRIN-CHANG CHUN LINE



CHINESE MARKET AT CHANG-CHUN



VIEW OF KIRIN FROM THE SUNGARI RIVER

TIME TABLE OF PASSENGER, GOODS AND CONSTRUCTION TRAINS

下行車次數
NUMBER OF DOWN TRAINS

站名 Name of Station		No. 1	No. 3	No. 5	No. 7	No. 9
頭道溝 T. T. K.	arr.					
	dept.	8.30	18.15			
長春 C C.	arr.	8.45	18.30			
	dept.	9.00		3.30	6.00	9.30
安龍泉 A. L. C.	arr.	pass		pass	pass	pass
	dept.	9.10		3.45	6.15	9.45
卡倫 K. L.	arr.	9.35		pass	pass	10.15
	dept.	9.40		4.15	6.45	10.20
飲馬河 Y. M. H.	arr.	10.15		4.55	7.25	11.00 **No. 6**
	dept.	10.25		5.05	7.35	11.05
下九台 H. C. J.	arr.	10.40 **No. 6**		pass	pass	11.22
	dept.	10.42		5.23	7.55	11.25
營城子 Y. C. J.	arr.	10.55		pass	pass	11.40
	dept.	11.00		5.38	8.10	11.50
馬鞍山 M. A. S.	arr.	11.13		5.53	8.25	12.05 **No. 8**
	dept.	11.15		6.00	8.30	12.10
土門嶺 T. M. L.	arr.	11.35 **No. 8**		6.25	8.55 **No. 6**	12.35
	dept.	11.45		6.35	9.02	12.45
樺皮廠 H. P. C.	arr.	12.40		7.35	10.00	13.45 **No. 2**
	dept.					

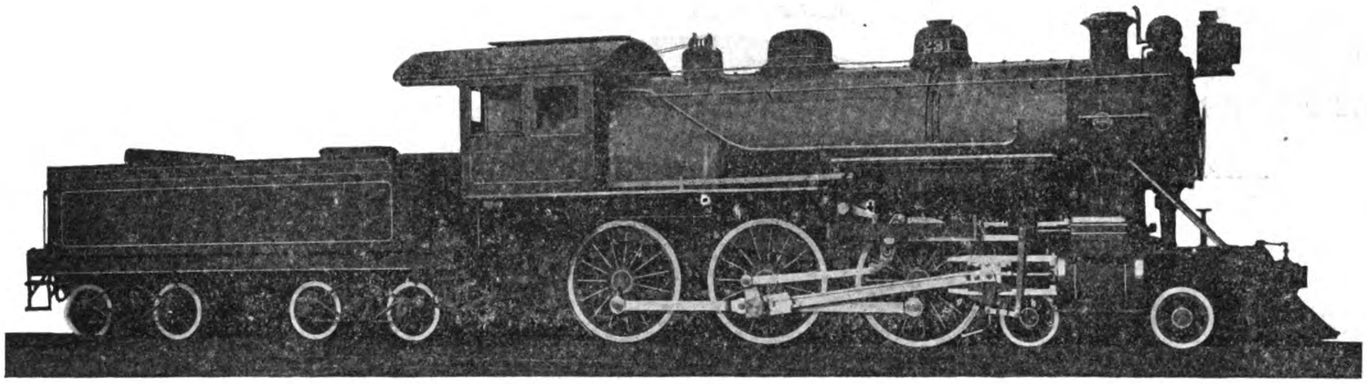
上行車次數
NUMBER OF UP TRAINS

站名 Name of Station		No. 2	No. 4	No. 6	No. 8	No. 10
樺皮廠 H. P. C.	arr.					
	dept.	13.50 **No. 9**		8.00	10.30	14.10
土門嶺 T. M. L.	arr.	14.50		9.00 **No. 7**	11.30 **No. 1**	15.10
	dept.	15.00		9.05	11.47	15.20
馬鞍山 M. A. S.	arr.	15.13		9.25	12.07 **No. 9**	15.35
	dept	15.15		9.30	12.12	15.45
營城子 Y. C J.	arr.	15.28		pass	pass	16.00
	dept.	15.33		10.05	12.27	16.05
下九台 H. C. J.	arr.	15.46		10.35 **No. 1**	pass	16.20
	dept.	15.48		10.43	12.42	16.22
飲馬河 Y. M. H.	arr.	16.03		11.01 **No. 9**	12.59	16.40
	dept.	16.13		11.10	13.07	16.50
卡倫 K. L.	arr.	16.53		pass	pass	[illegible]
	dept.	16.58		11.55	13.52	17.40
安龍泉 A. L. C.	arr.	pass		pass	pass	pass
	dept.	17.23		12.25	14.22	18.10
長春 C. C.	arr.	17.33		12.40	15.37	18.25
	dept.	17.45	8.00			
頭道溝 T. T. K.	arr.	18.00	8.15			
	dept.					

Nos. 1, 2, 3 and 4 are passenger trains. 第一,二,三,四次係客車
,, 9 and 10 ,, goods ,, 第九,十次係貨車
,, 5, 6, 7 and 8 ,, construction ,, 第五,六,七,八次係工程車

Traffic Manager.

BALDWIN LOCOMOTIVES FOR KOREA



TEN-WHEELED LOCOMOTIVE FOR PASSENGER SERVICE, KOREAN GOVERNMENT RAILWAYS

Cylinders, 20″×26″
Driving-wheels, diameter 66″
Steam Pressure, 180 lbs.
Weight on driving-wheels, 116,650 lbs.
Weight, total engine, 150,850 lbs.
Tractive force, 24,100 lbs.

The illustration shows one of twelve passenger locomotives, recently built by The Baldwin Locomotive Works for the Korean Government Railways. The boiler has a straight top, with a wide fire-box placed above the rear driving wheels. The grate is sloped toward the front, in order to increase the depth of the fire-box throat; and a brick arch, supported on water-tubes is installed. The fire-box volume is increased by the use of a combustion chamber. Balanced slide valves control the steam distribution, and the valve-motion is of the Walschaerts type.

This is an excellent design of locomotive for general road service, as it is simple in construction, with no new or untried features, and has good steaming and hauling capacity. With a moderate load per wheel, the locomotive illustrated can safely be used on 70-pound rails.

Agents for China:—ARNHOLD, KARBERG & Co., SHANGHAI, TIENTSIN, HONGKONG and HANKOW

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Pure, Fresh air; cool, bracing and invigorating climate.

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SEE BAGUIO AMONG THE PINES

Only 9 hours run from Manila by a Railroad and Government Automobiles.

Special low Season Rates from March 31st until July 1st.

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Day service: Round Trip Tickets to Baguio, including Automobiles, P27.90 first class; P23.00 second class; P11.00 third class.

Night service: Round Trip, including Automobiles and sleeping accommodation on train, P38.50 first class; P15.00 third class.

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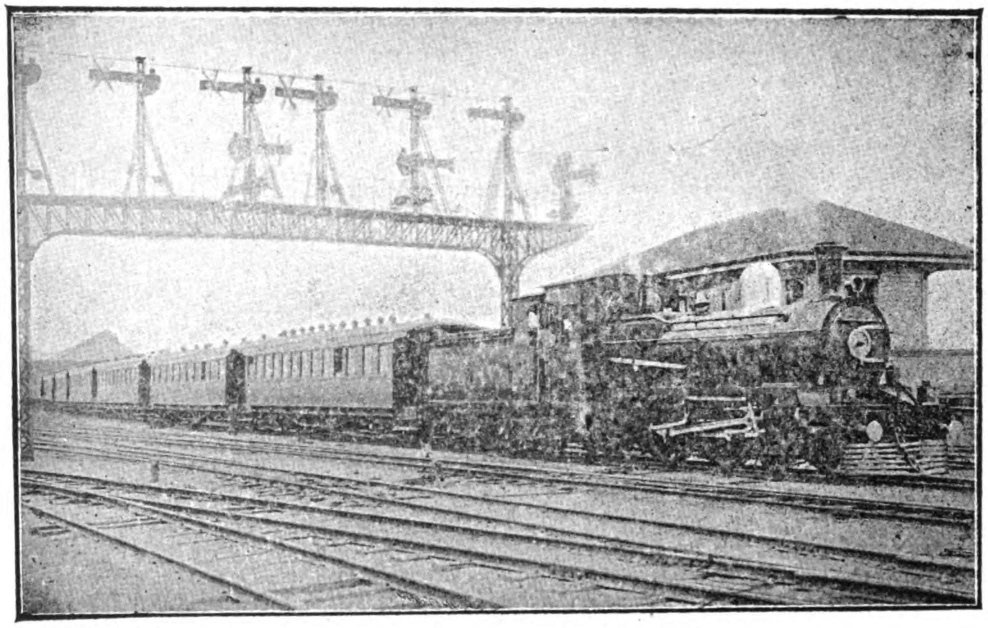

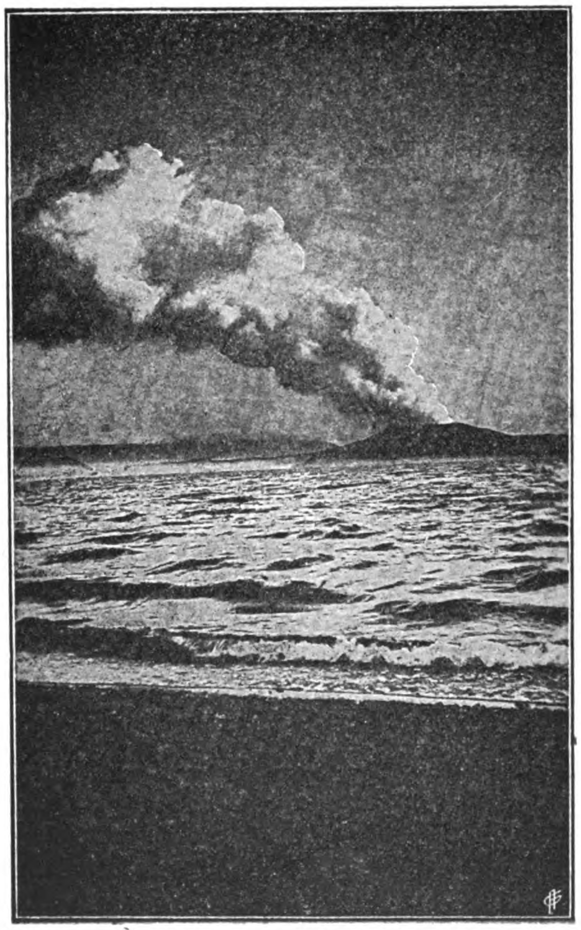

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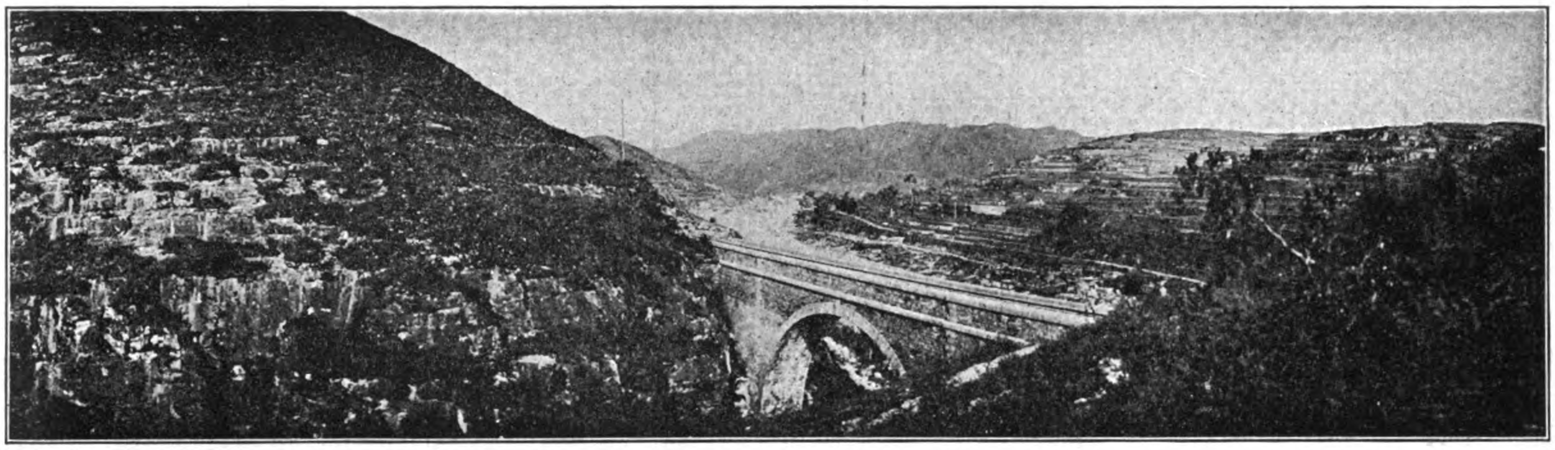
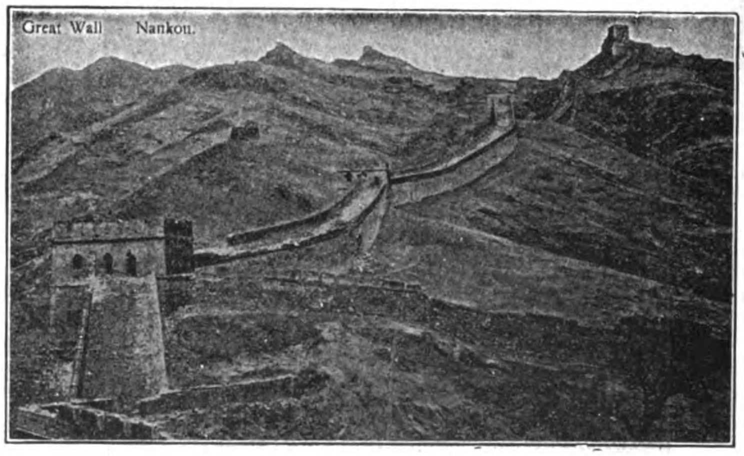


VIEWS ALONG ROUTE OF CHENG-TAI RAILWAY

The trains of this line connect with the through service of the Peking-Hankow Railway, affording Travellers the opportunity of seeing the most picturesque part of China. The line passes through a mountainous section of country, rich in Mineral Resources to the Provincial Capital of Shansi at Taiyuanfu. This interesting city is a great educational center, and famous for the fine quality of its artistic embroideries.

The Peking-Kalgan Line

"THE ROAD TO THE GREAT WALL"



This line follows the ancient caravan route and military highway from Mongolia into China by the way of the historic Nankow Pass. This pass is the Key to Peking, and Kalgan is the gate of the Country. From here the great camel caravans set out on their long journeys across Mongolia to Siberia and Central Asia. This old frontier mart, retaining its time-honored characteristics, one of the most interesting sights of the Old World, is made accessible by the new railway. The line also carries the passenger in two hours from Peking to Nankow, when the Great Wall of China and the Ming Tombs may be seen. A foreign hotel is operated by the railway authorities at Nankow, where chairs and guides may be secured for the Tombs.

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TIENTSIN-PUKOW LINE

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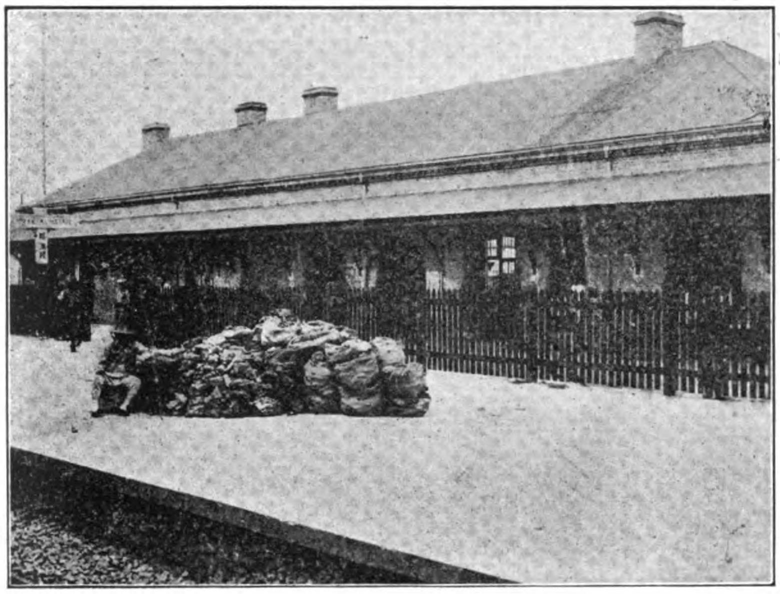
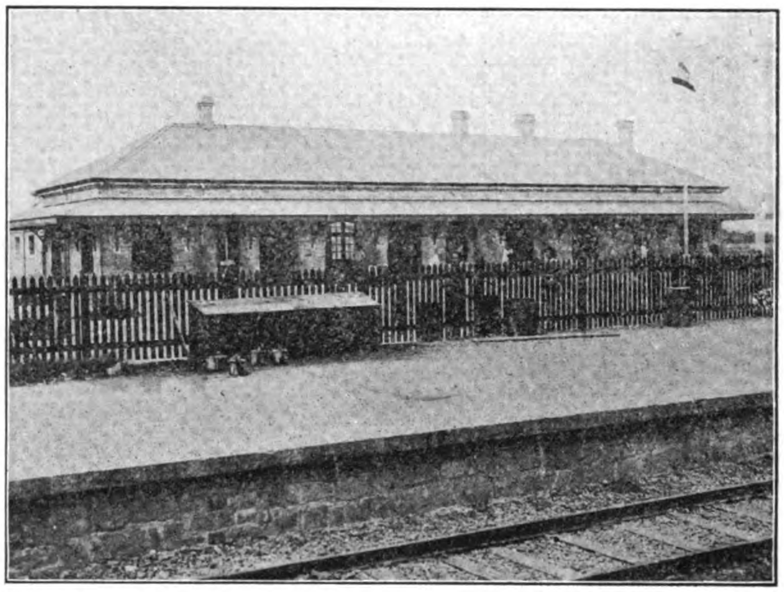




STATION AT LIU HUAI KUAN — TIENTSIN-PUKOW RAILWAY. BRITISH OR SOUTHERN SECTION — STATION AT PENG-PU

Notice is hereby given that through express service of first, second and third classes with dining and sleeping cars from Tientsin to Pukow has been inaugurated on December 4th, 1912, and until further notice. These trains will leave Pukow on Mondays and Fridays, and Tientsin, on Wednesdays and Saturdays, stopping only at the principal stations en route.

Departure			Arrival		
Monday / Friday	Pukow	9.00 A.M.	Tuesday / Saturday	Tientsin	11.07 A.M.
Wednesday / Saturday	Tientsin	1.00 P.M.	Thursday / Sunday	Pukow	3.15 P.M.

Detailed Time Table will be found hereafter in the back pages of this paper.

EXPRESS FARE TABLES

	PUKOW-HSUCHOWFU	HSUCHOWFU-TSINANFU	TSINANFU-TIENTSIN
1st class	$13.90	$13.60	$14.60
2nd ,,	9.30	9.05	9.70
3rd ,,	4.65	4.50	4.90

LUGGAGE ALLOWANCE

1st class, 150 catties; 2nd class, 100 catties; 3rd class, 50 catties.

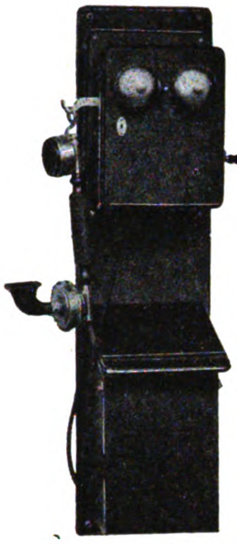
Excess luggage is charged at one (1) cent per picul per mile on the express trains and half a cent on ordinary trains.

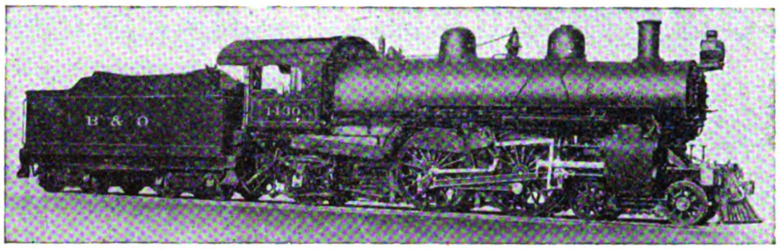
Only first class passengers are entitled to book sleeping berths, at $5.00 per berth.

The Railway ferry steam-launch, lying at the jetty above the Japanese Hulk, will carry passengers across the river forty minutes before the trains leave. Passengers may book their tickets at the office on the ferry jetty.

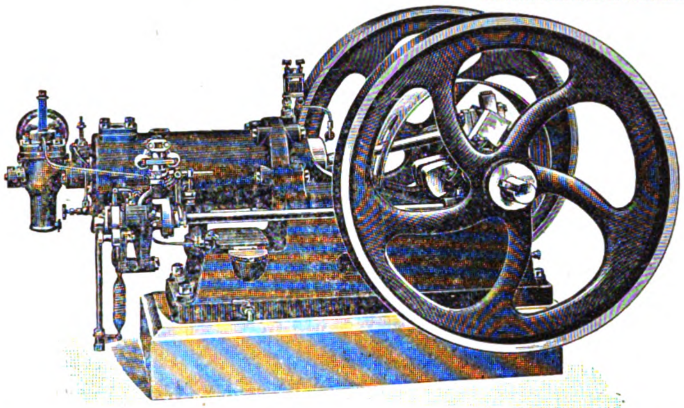
The ordinary trains running between Pukow-Hsuchowfu, Hsuchowfu-Tsinanfu, and Tsinanfu-Tientsin will continue as before. For time refer to the Time Table.

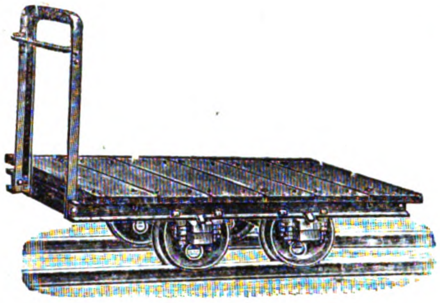
For further particulars, etc., apply to the Traffic Department at Tientsin or Head Office, Nanking.

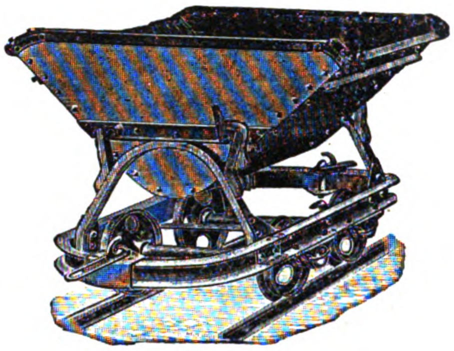




BALDWIN LOCOMOTIVES







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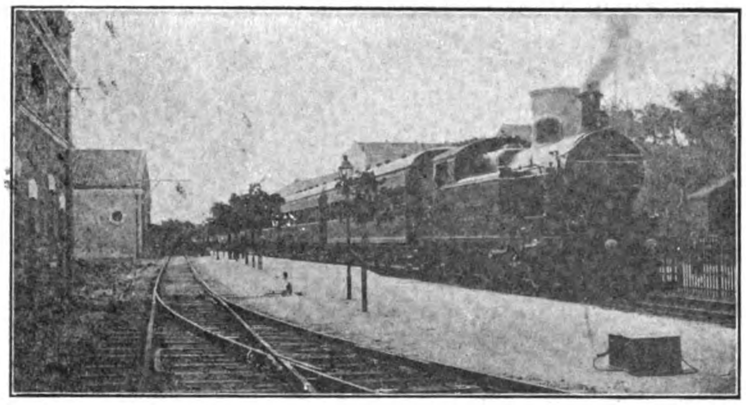
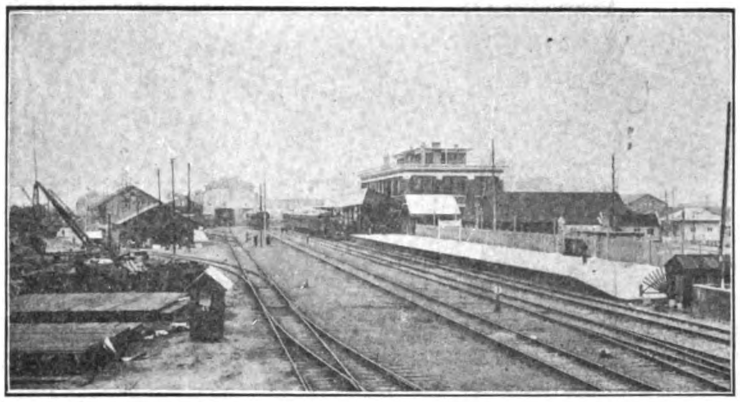
CANTON-KOWLOON RAILWAY

VIEWS ON THE BRITISH SECTION (22 MILES) **VIEWS ON THE CHINESE SECTION, 89 MILES. (Chinese Government Railways)**

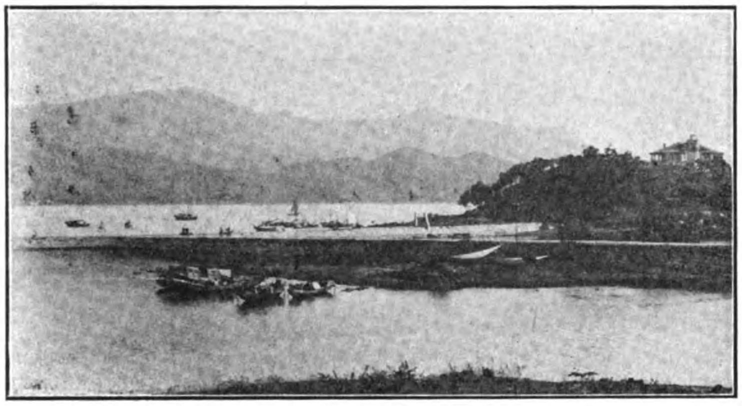


Temporary Station at Kowloon

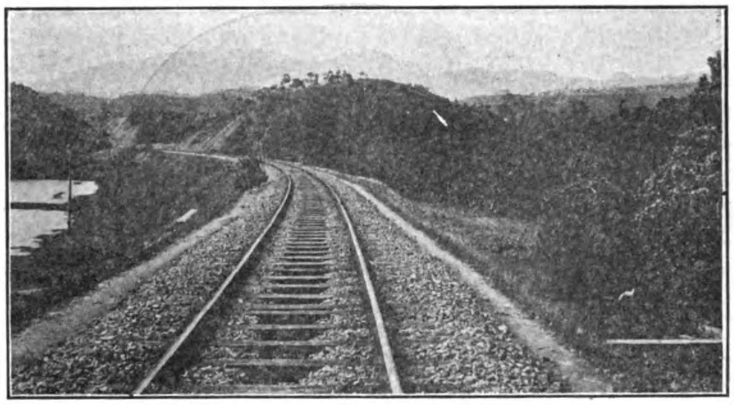


Tai Sha Tan Station, Canton

QUICKEST AND CHEAPEST ROUTE BETWEEN CANTON AND HONGKONG THROUGH VARIED AND BEAUTIFUL SCENERY

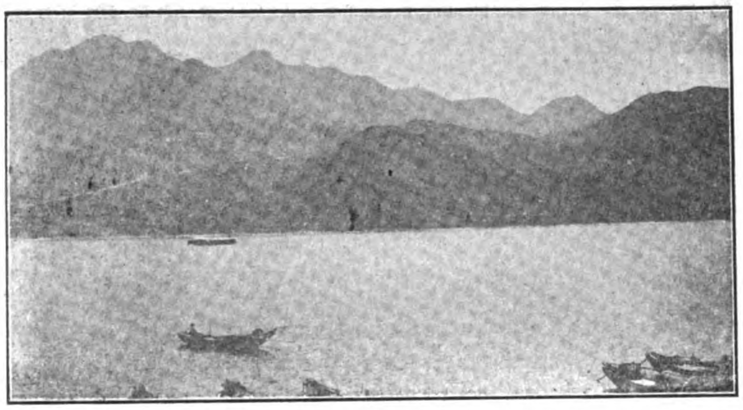


The "Eight Genii Range" from Tai-po

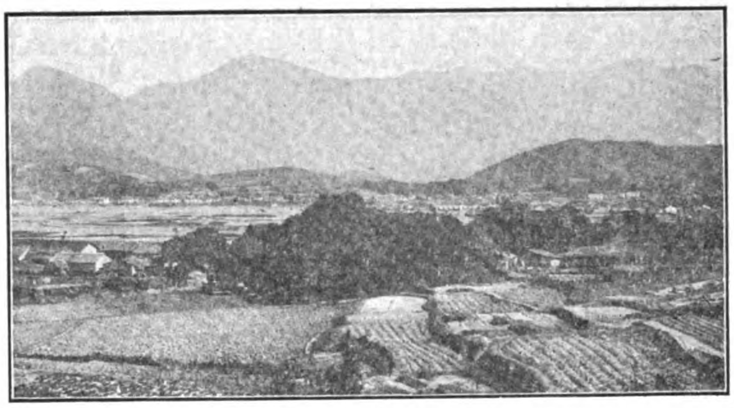


Near Le Loong, Canton-Kowloon Railway

TWO EXPRESS CORRIDOR TRAINS EACH WAY DAILY HOT MEALS AND OTHER REFRESHMENTS SERVED

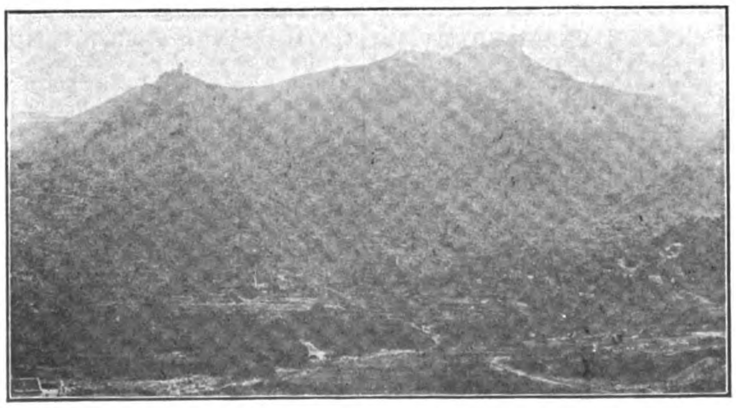


The Hunch-backs and Pyramid Hill

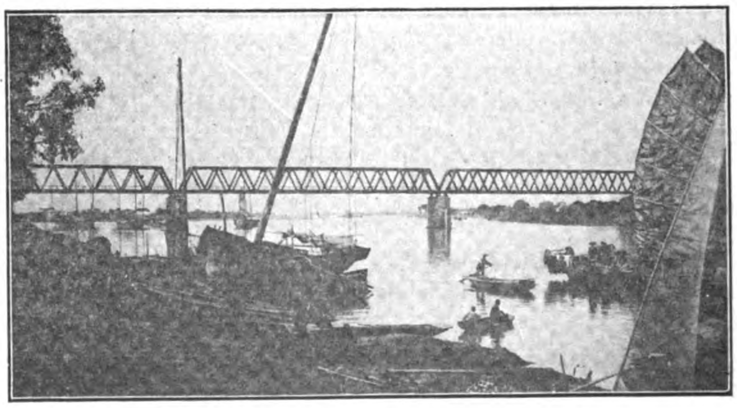


Villages, Canton-Kowloon Railway

4¼ HOURS BETWEEN UP AND DOWN TRAINS FOR BUSINESS MEN OR TOURISTS AT CANTON OR HONGKONG



The Lion's Head and Statue Rock, Shatin Valley



East River Bridge, Canton-Kowloon Railway

SUMMER SEASON 1913.

Leave Hongkong (Kowloon)	7.15 a.m. 3.00 p.m.	Leave Canton (Tai Sha Tou)	7.00 a.m. 3.15 p.m.
Arrive Canton (Tai Sha Tou)	11.00 a.m. 6.41 p.m.	Arrive Hongkong (Kowloon)	10.43 a.m. 6.54 p.m.

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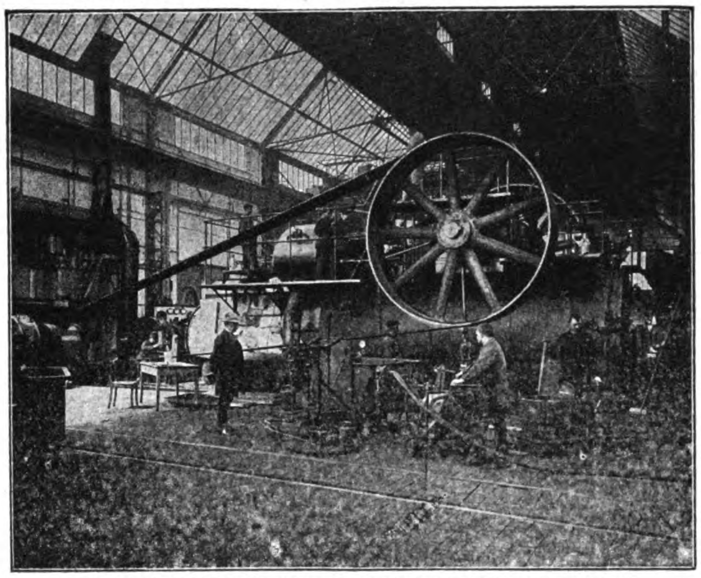
Allahabad, 1911: GOLD MEDAL.
Brussels, Buenos Aires, 1910, Roubaix, Turin, Dresden, 1911: EIGHT GRANDS PRIX.



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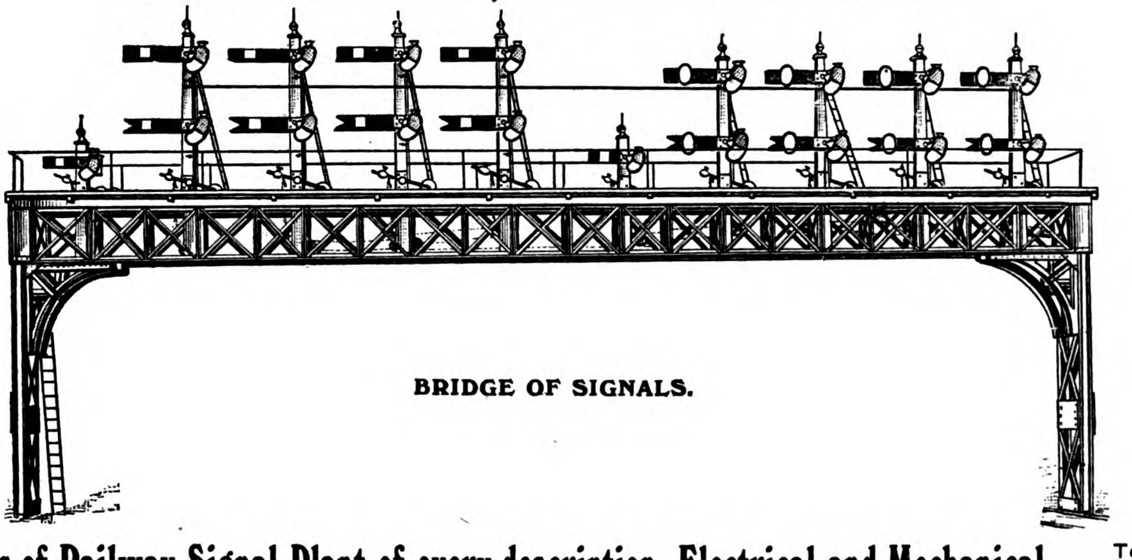

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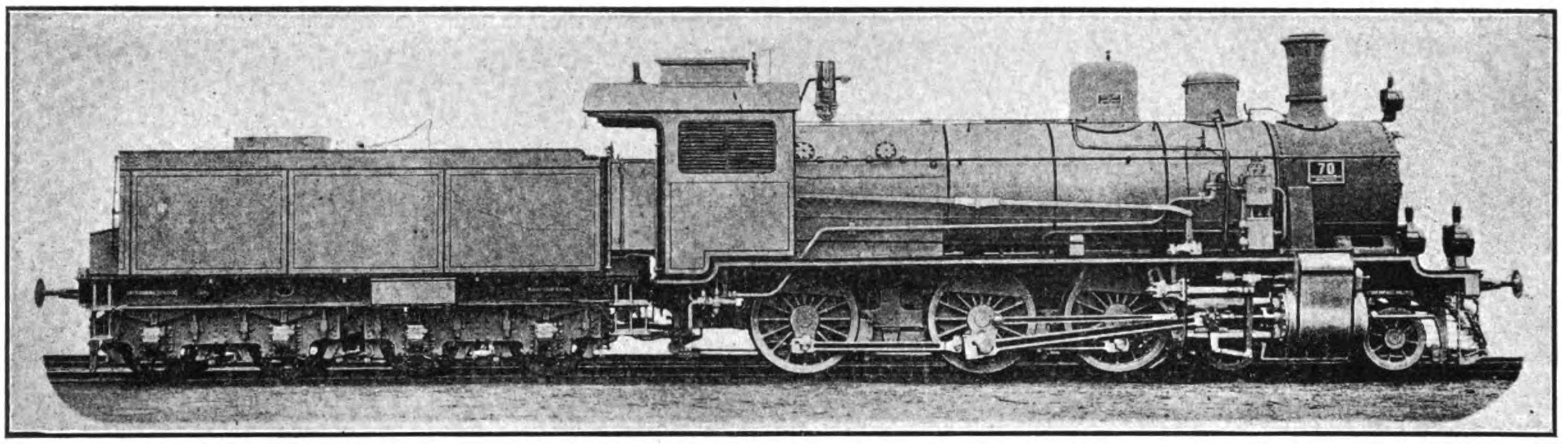

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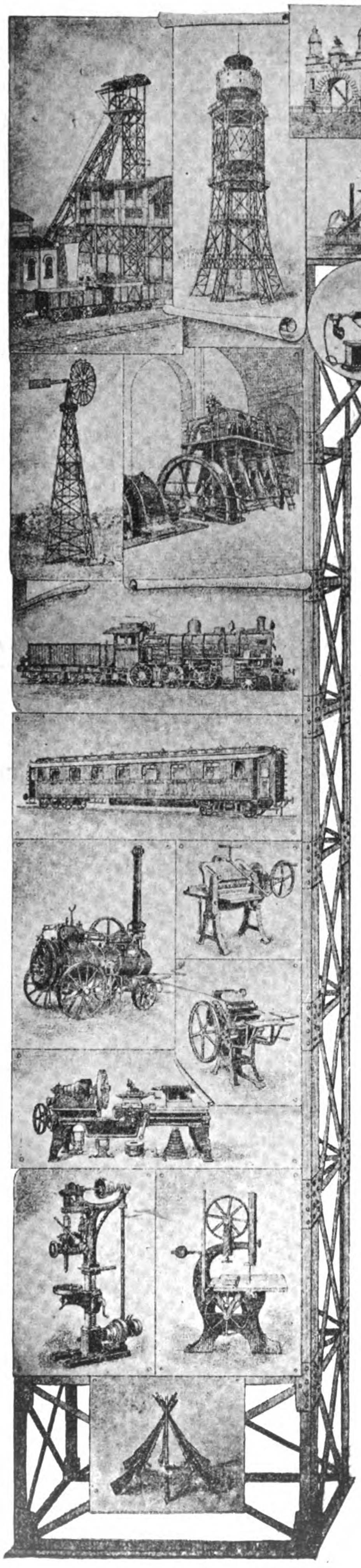

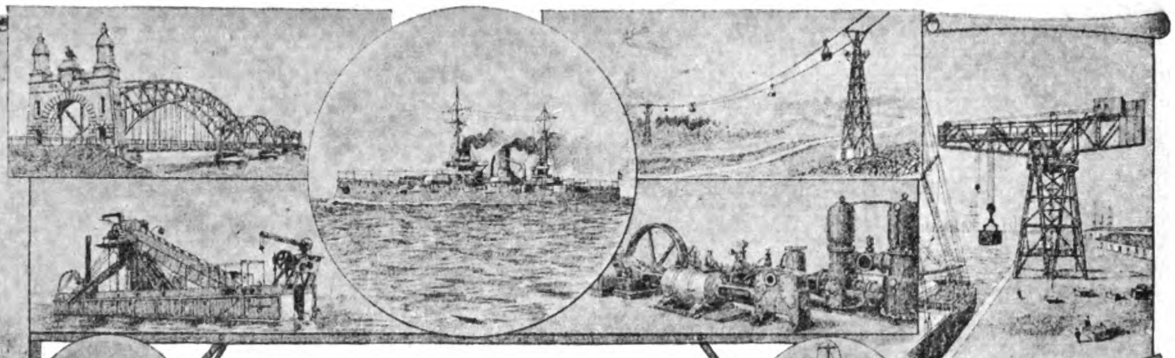

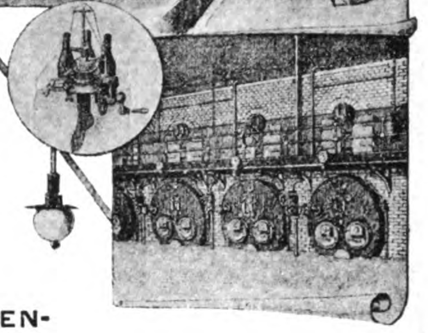

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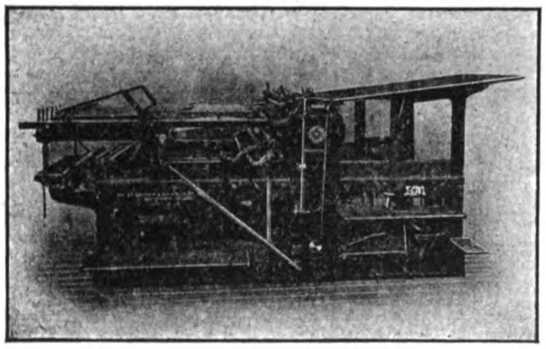

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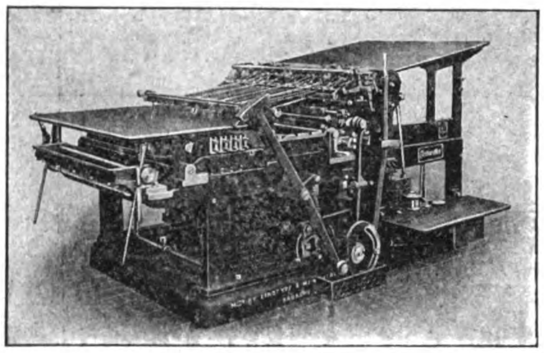

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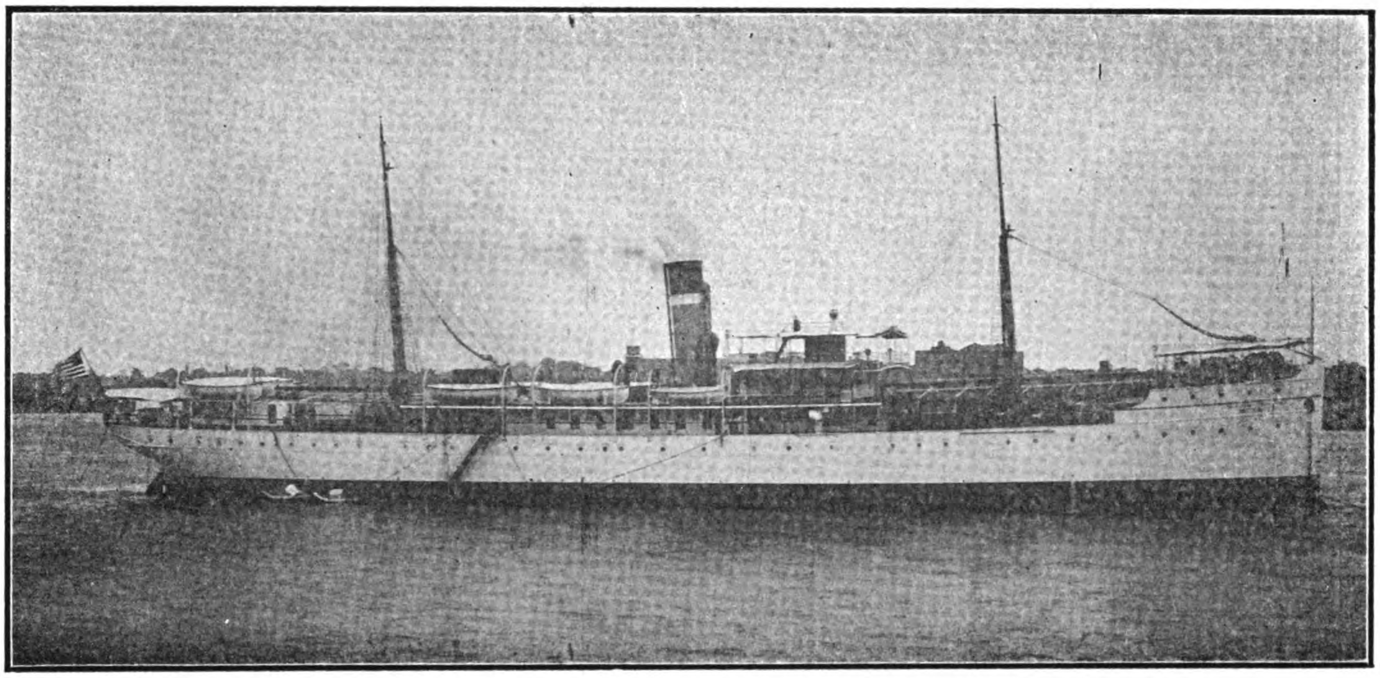

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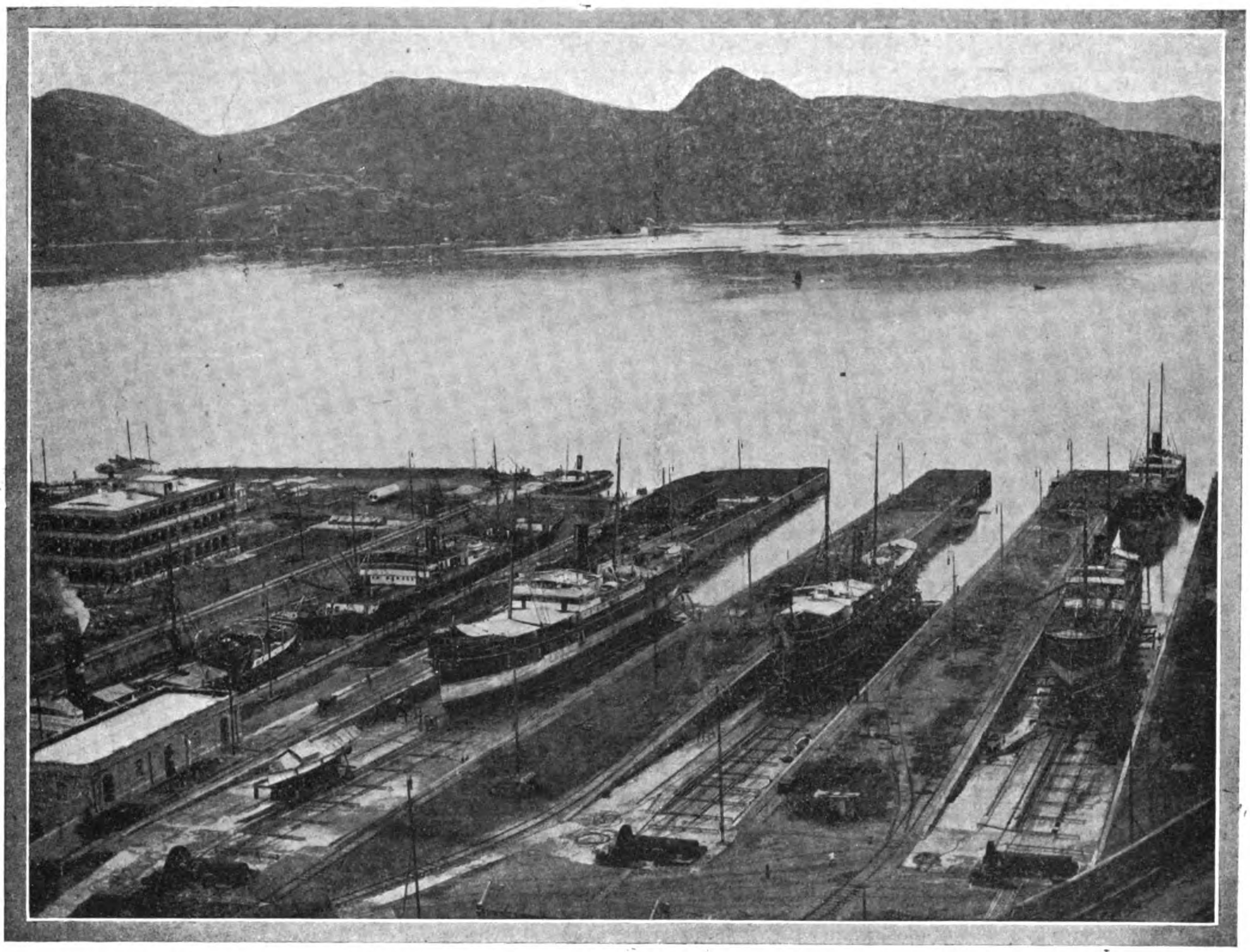

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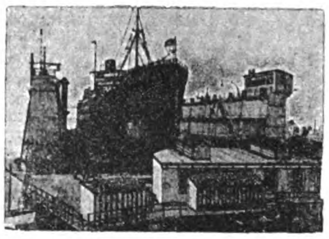

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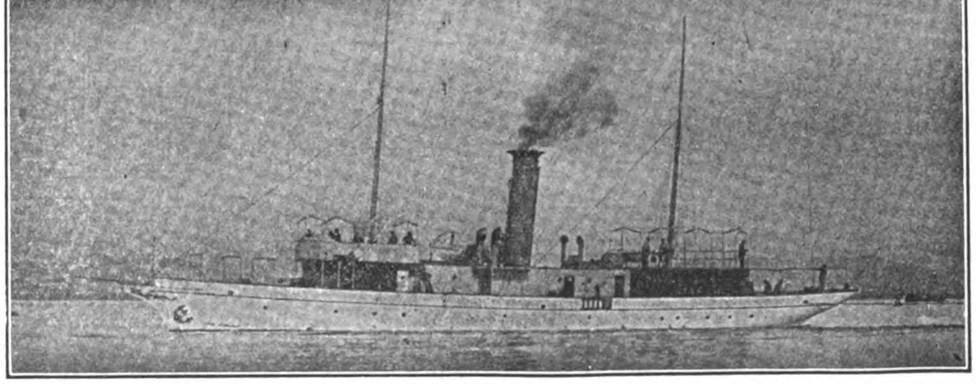

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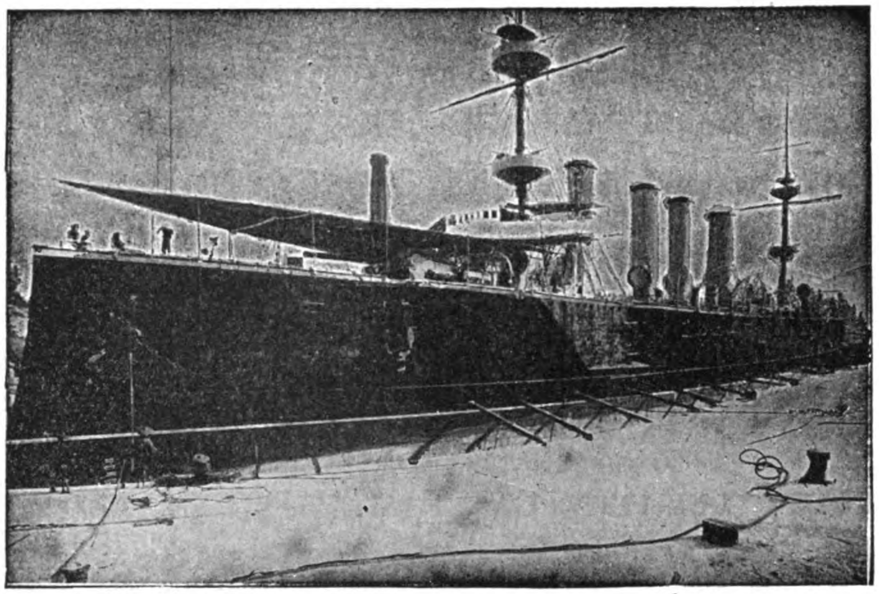

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Name of Dock or Slip	*Length on Keel Blocks*	*Entrance Breadth*	*Depth Over Sill at Ordinary Spring Tides*	*Rise of Tide*	
				Springs	*Neaps*
KOWLOON	*Feet*	*Feet*	*Feet*	*Feet*	*Feet*
No. 1 Dock, Kowloon - - -	700	86 ft. top 70 ft. bottom	30′	7′ 6″	3
No. 2 Dock, Kowloon - - -	371	74′	18′ 6″	7′ 6″	——
No. 3 Dock, Kowloon - - -	264	49′ 3″	14′	7′ 6″	——
Patent Slip, No. 1, Kowloon -	240	60′	14′	7′ 6″	——
Patent Slip, No. 2, Kowloon -	220	60′	12′	7′ 6″	——
TAI-KOK-TSUI					
Cosmopolitan Dock - - - -	466	85′ 6″	20′	7′ 6″	——
ABERDEEN					
Hope Dock - - - - - - -	430	84′	23′	7′ 6″	——
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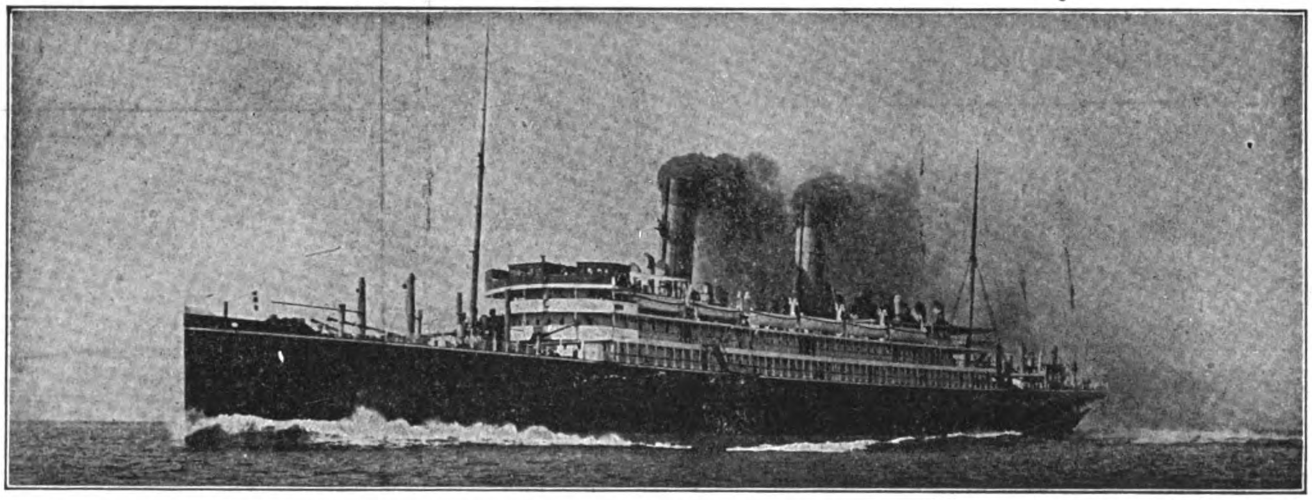

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„ „ „ „ Bottom	77	„
Water on Blocks at Spring Tide	23½	„

DOCK No. 2.

Extreme Length	371	Ft.
Length on Blocks.	360	„
Width of Entrance on top . .	66	„
„ „ „ „ Bottom.	53	„
Water on Blocks at Spring Tide	22	„

DOCK No. 3.

Extreme Length	722	Ft.
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Width of Entrance, top . . .	99½	„
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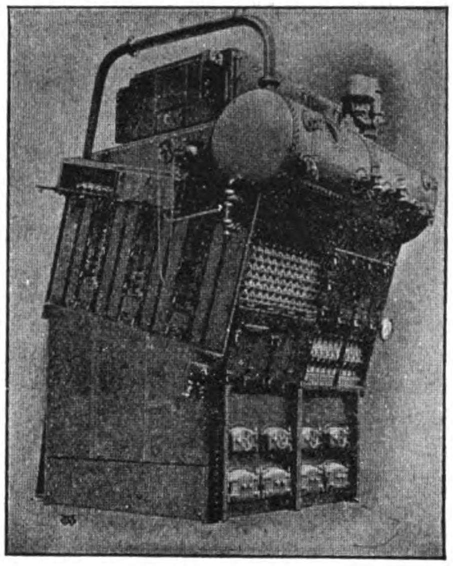

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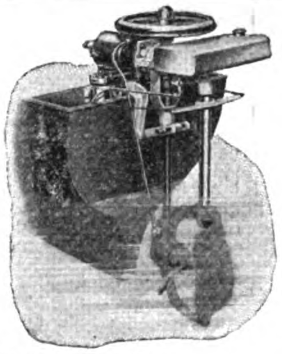

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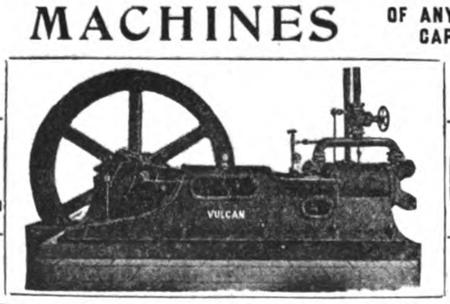
VUL  CAN

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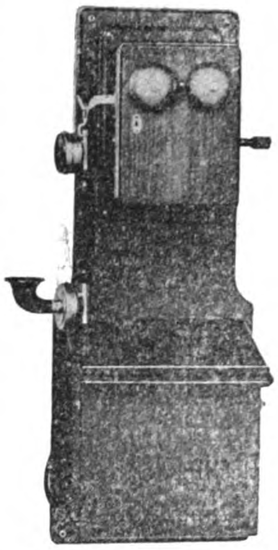

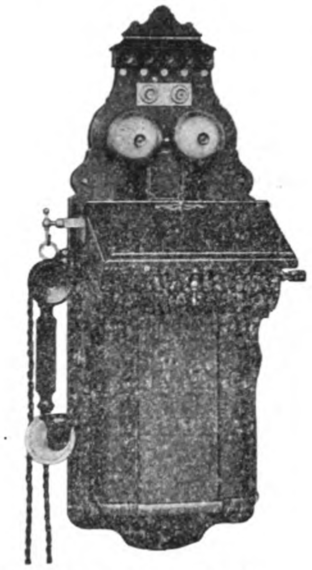

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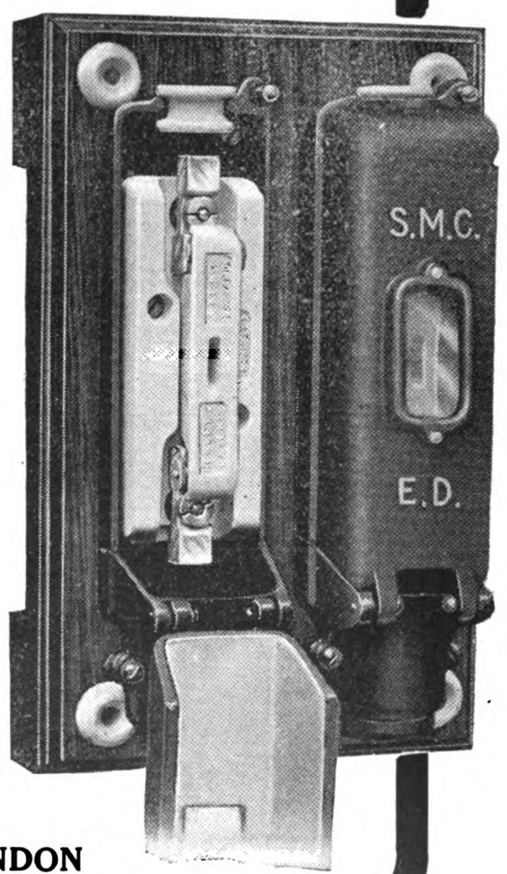

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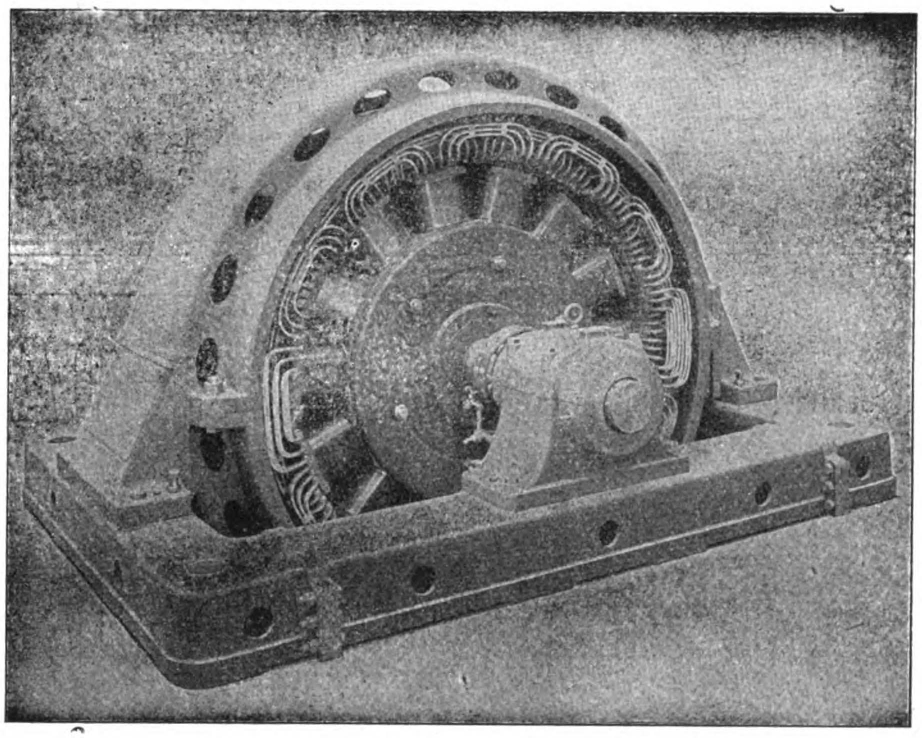

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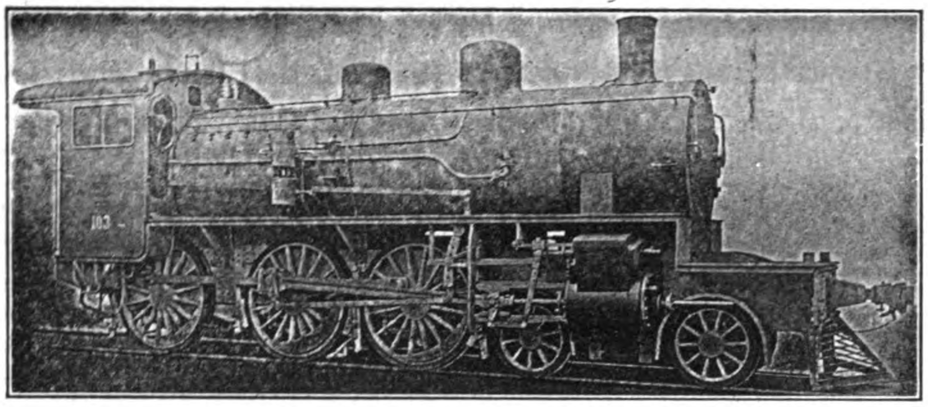

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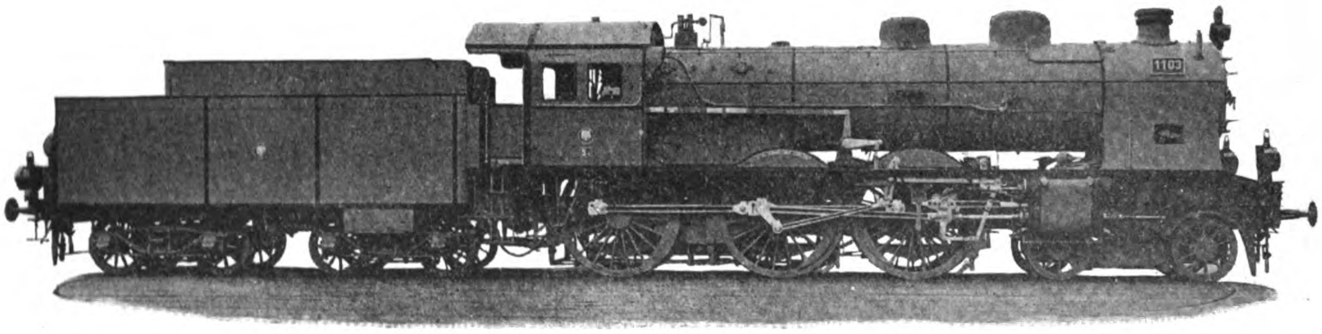

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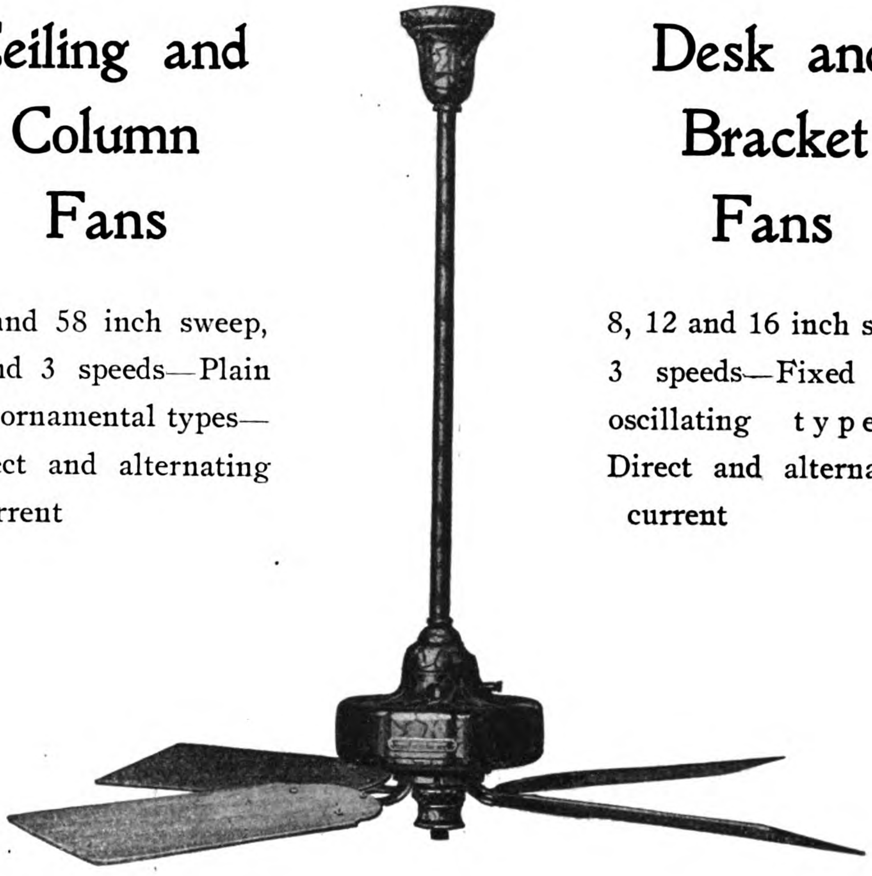

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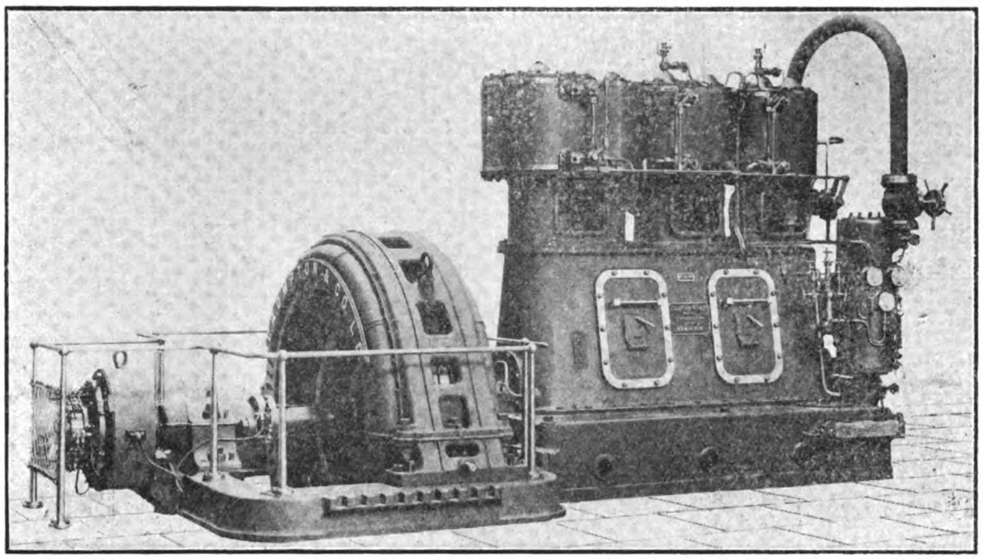

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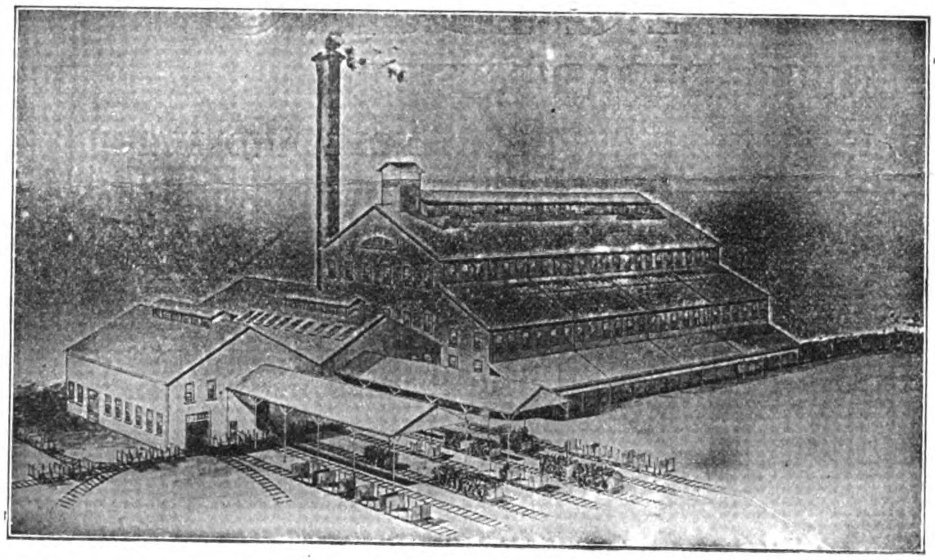

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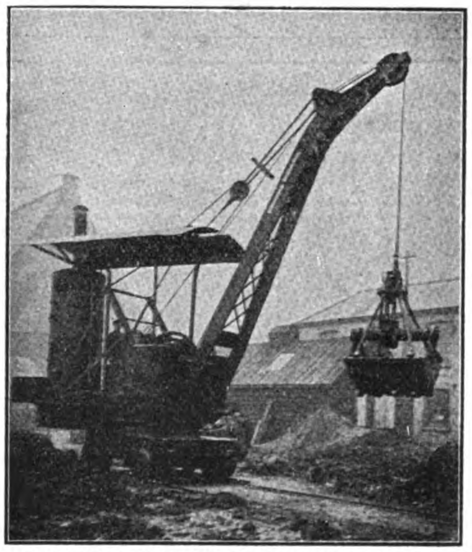

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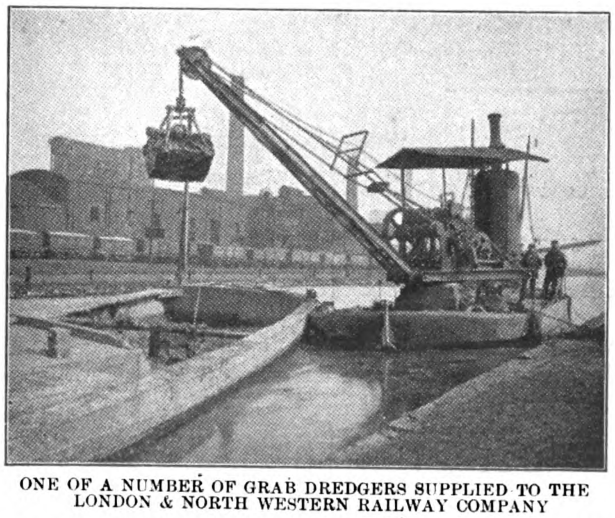

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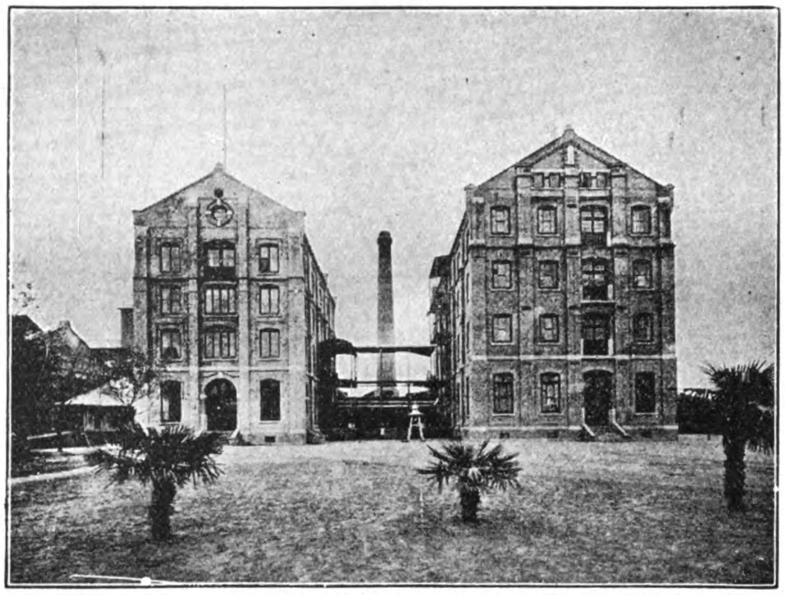

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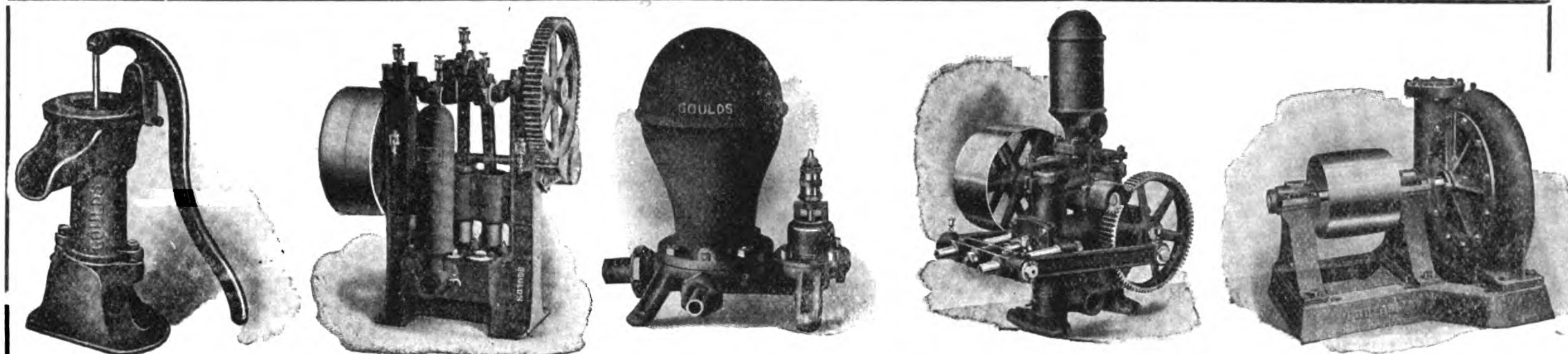

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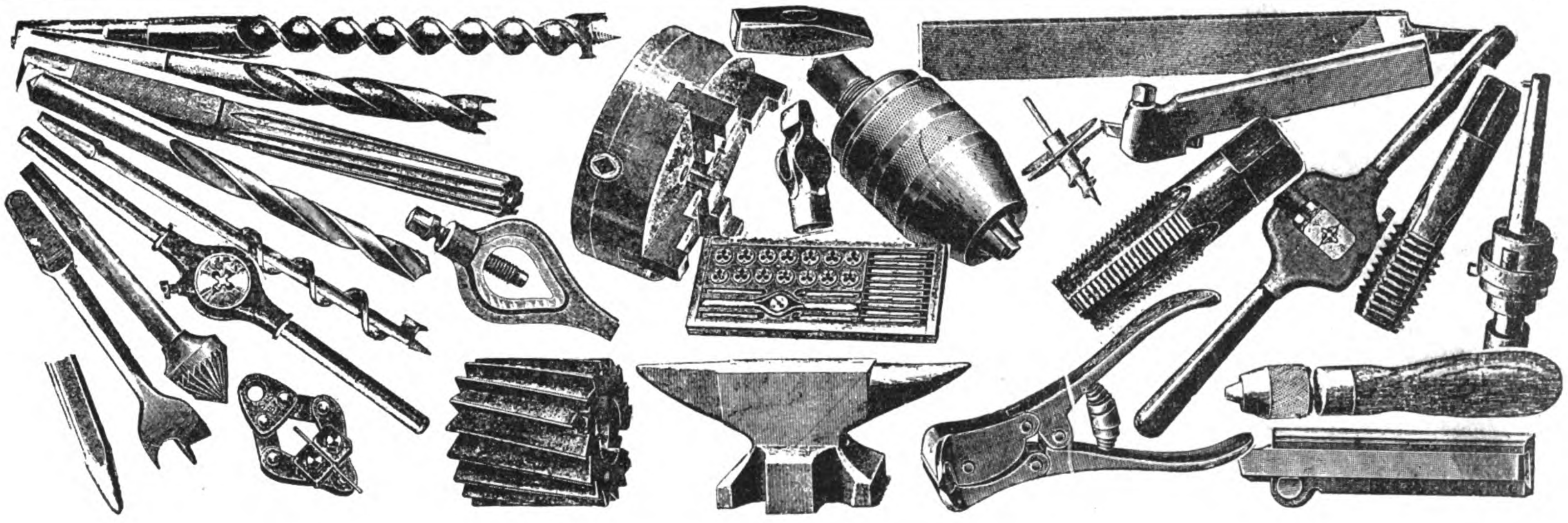

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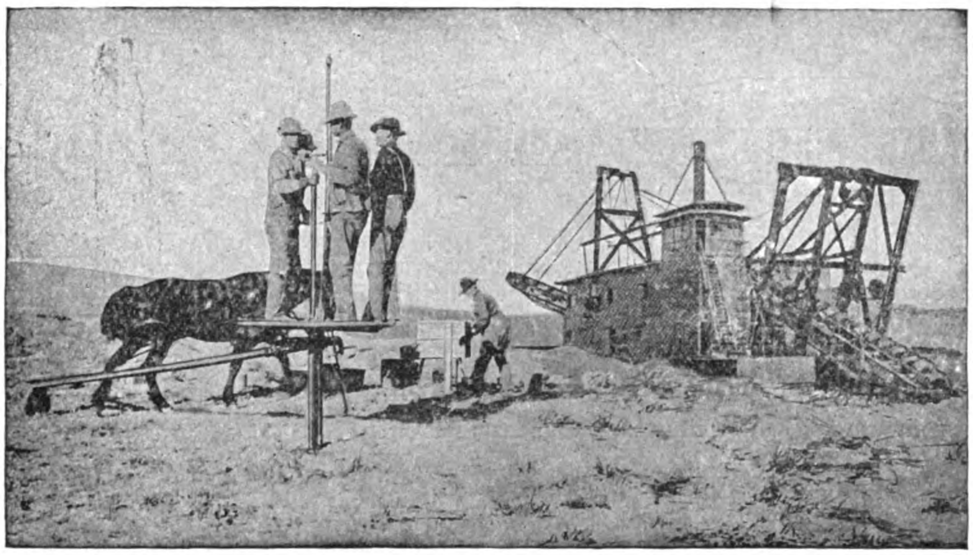

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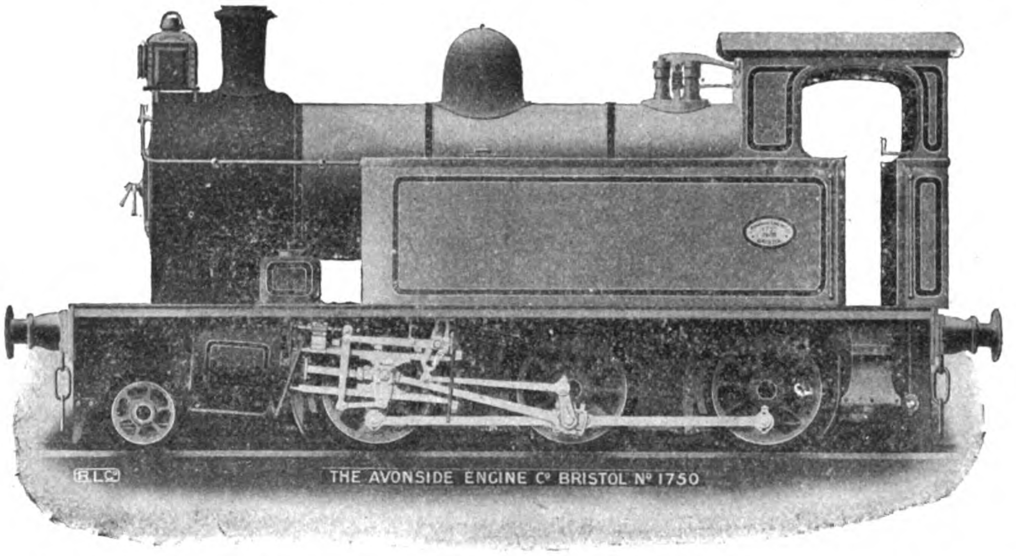

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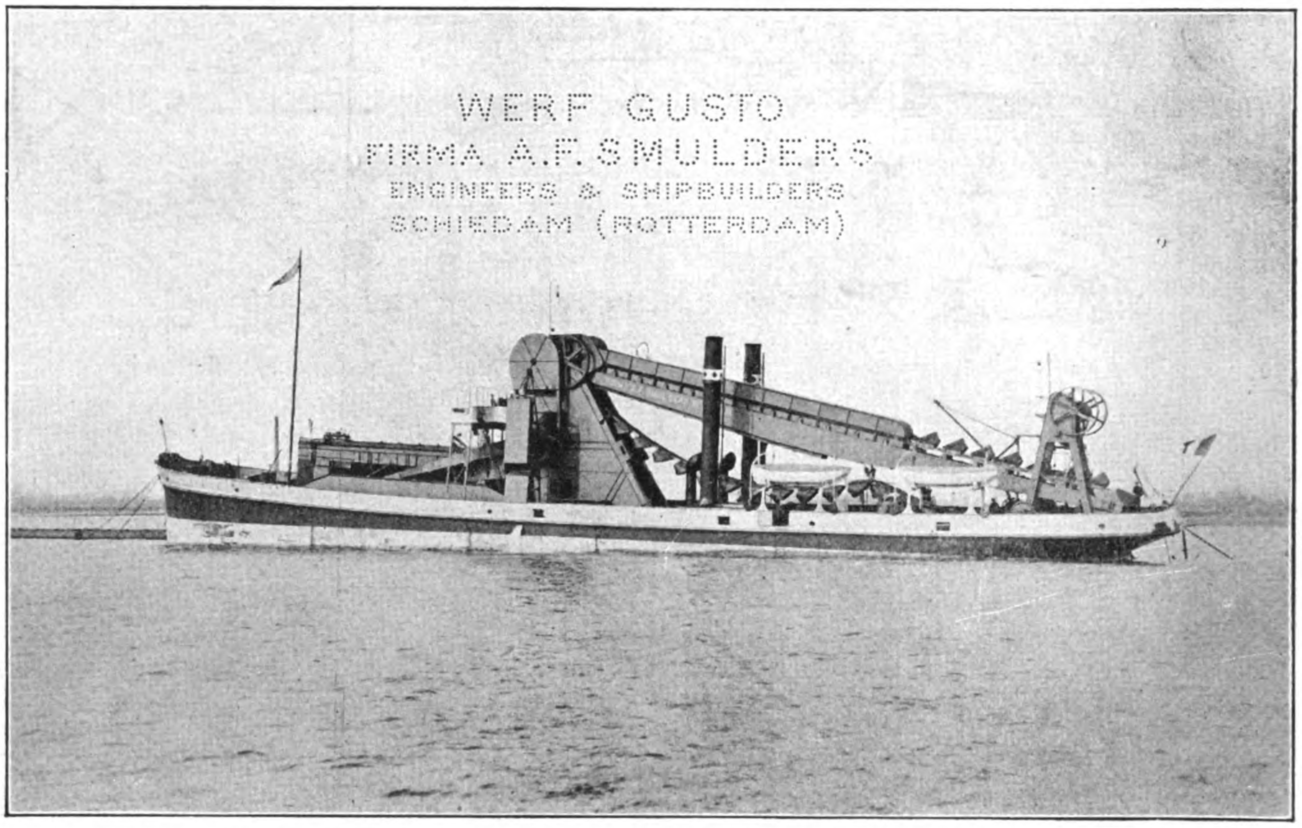

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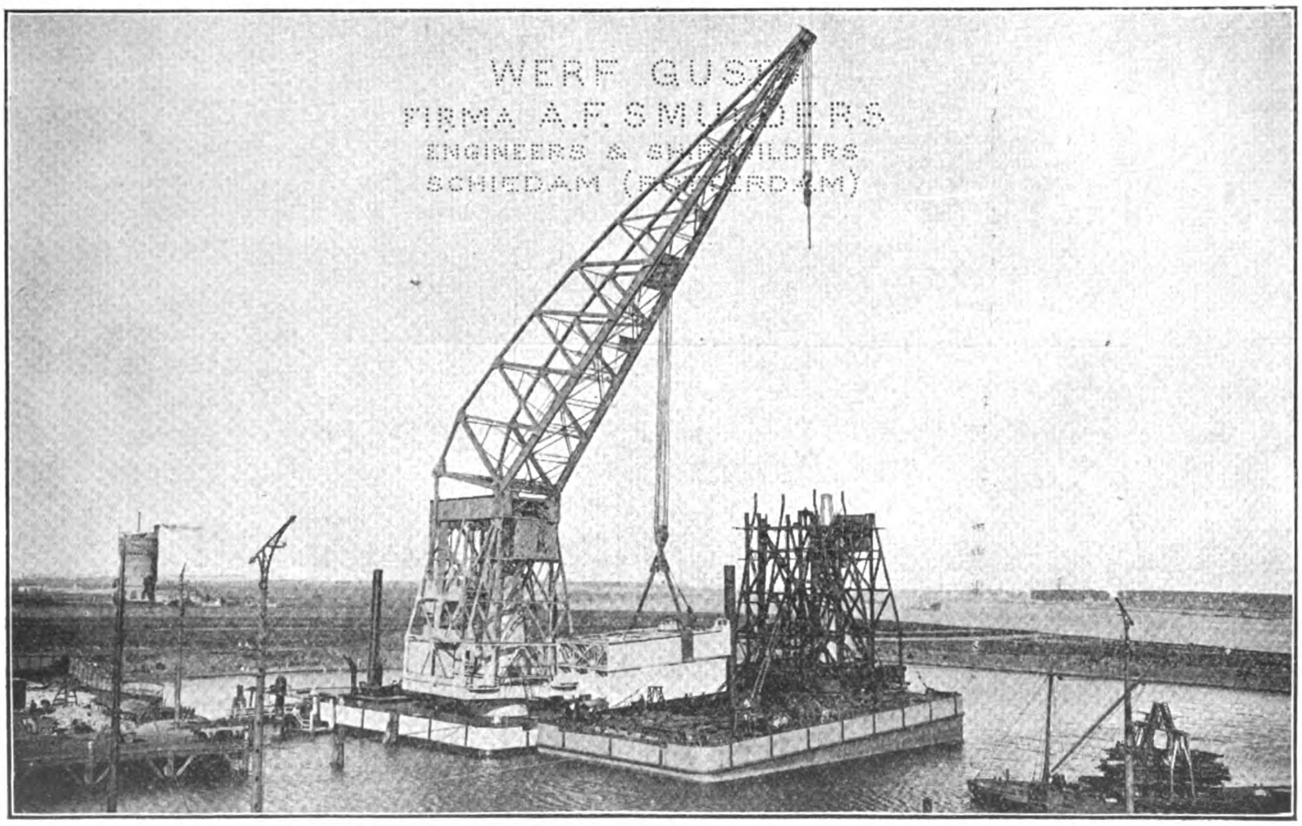

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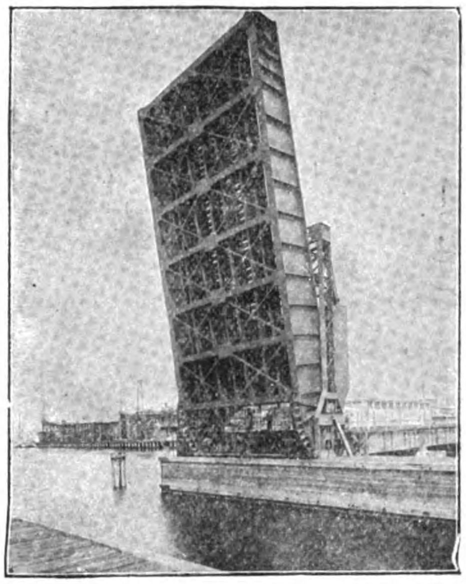

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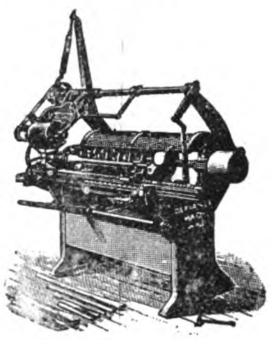

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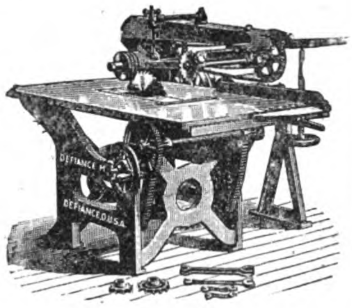

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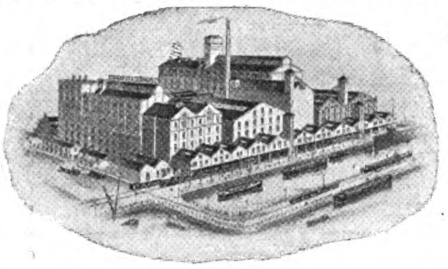

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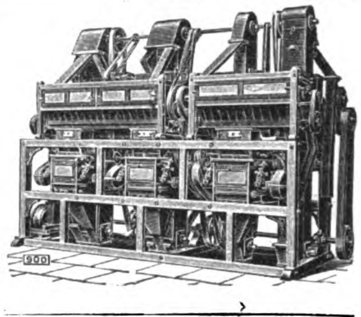

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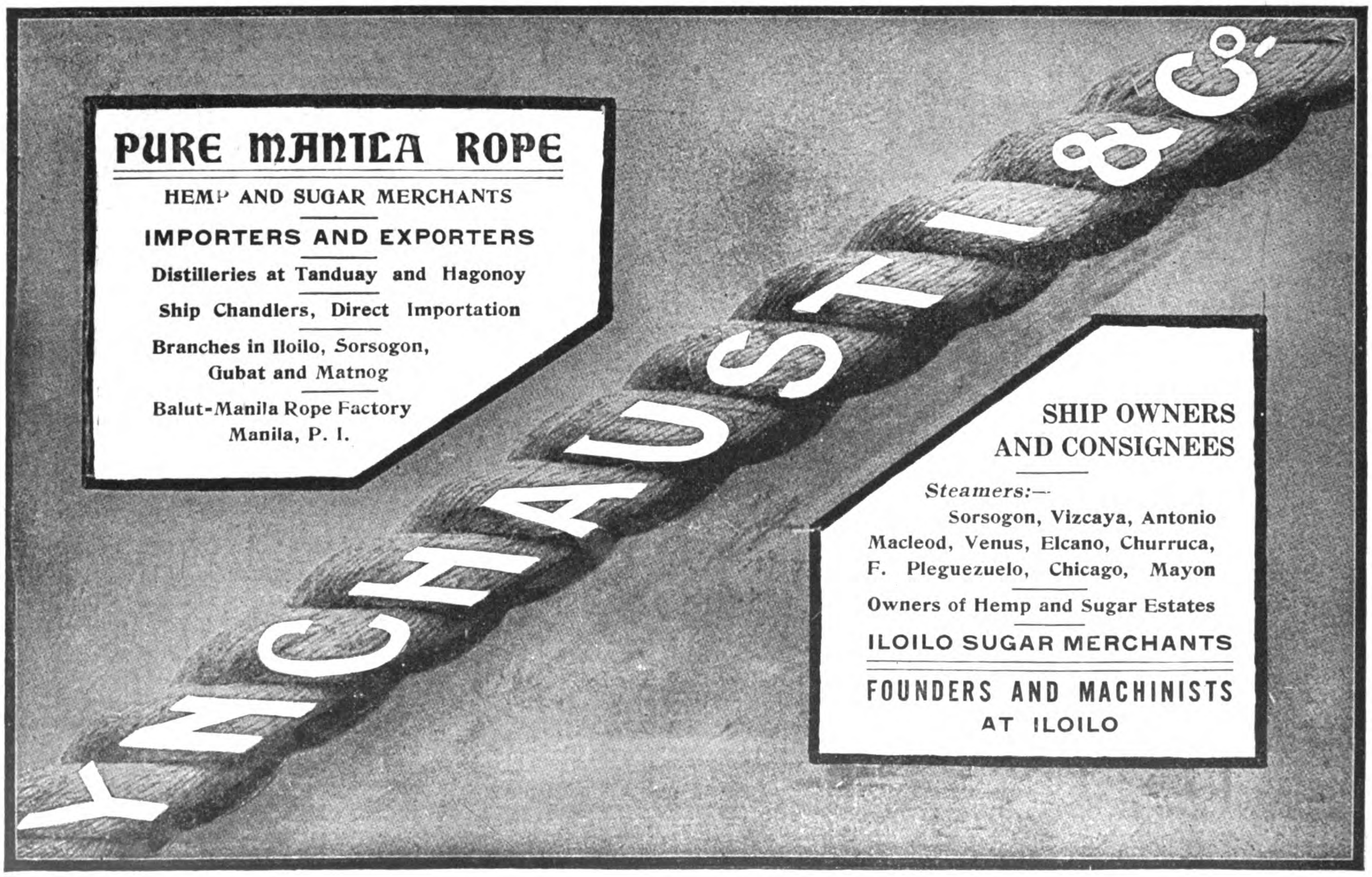

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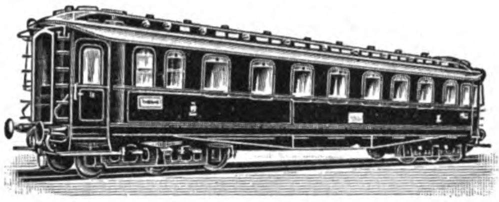

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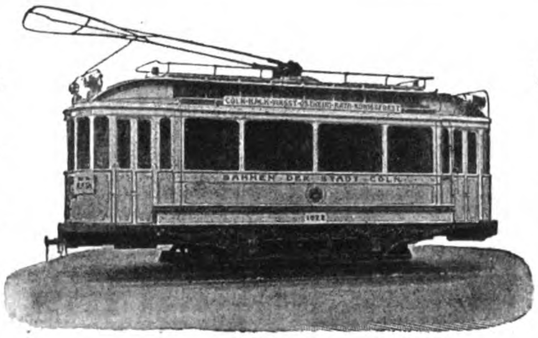

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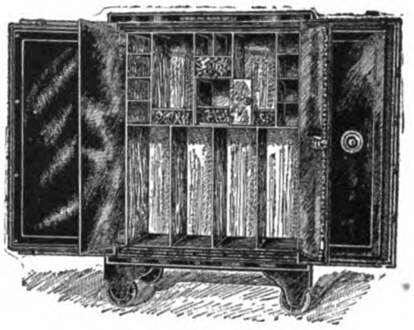

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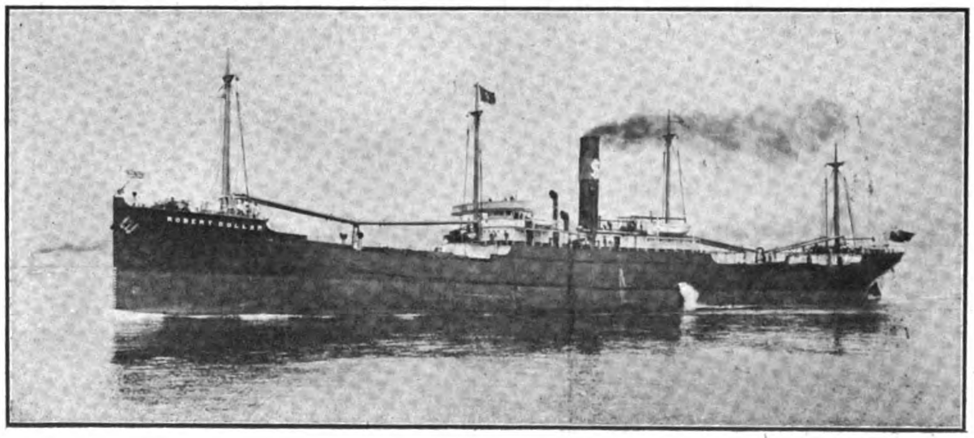

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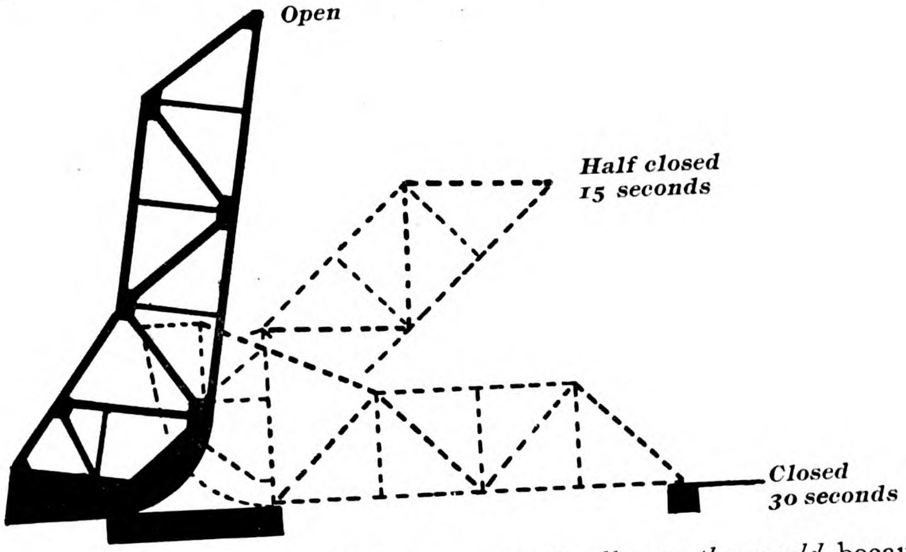

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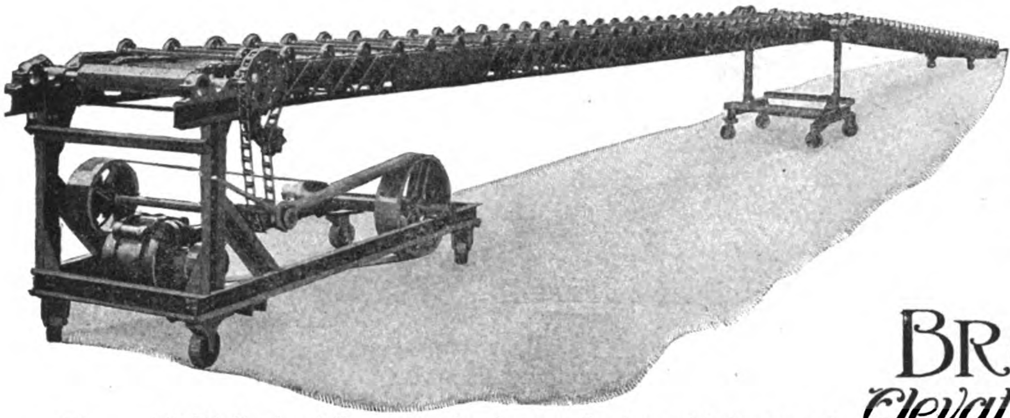

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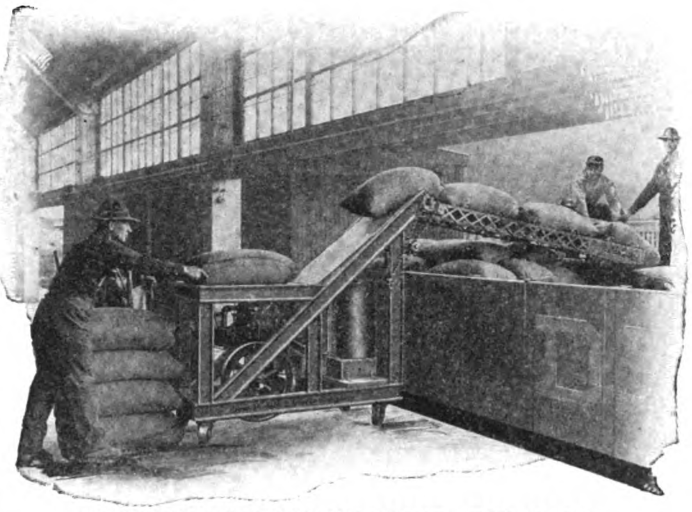

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Equipped with Gasoline Engine and Unloading Platform
May be combined with Conveyor or Piling Machine

IT COSTS MORE PER TON TO MOVE GOODS BY HAND THAN BY ANY OTHER METHOD. TO REDUCE COSTS AND INCREASE PROFITS IS THE PURPOSE OF THE

BROWN-PORTABLE

Elevators-Conveyors-Unloaders

"A TON A MINUTE"

Made to suit any special conditions and to handle goods in any form of package

We want every person interested in the Economic Handling of Packed Materials to know about the "B-P" money-saving systems of piling, elevating, and conveying materials. This comprises four distinct types of machines and is adaptable to any industry handling quantities of goods in packages of any size, weight, or shape:

1. The **"Standard" Elevator** is made in eight regular sizes (with intermediate sizes to meet special conditions), piling to varying heights up to thirty feet. This type of machine is used for piling light and medium weight bags or bales, the lower tiers being easily placed by hand, and also, by use of a specially designed carriage, for piling boxes, barrels, kegs, rolls, undles, crates or other packages.

2. The **"Combination" Piler and Conveyor** is made with two carriers, the upper one being adjustable to pile from the floor up to any height. This machine is specially recommended for the heavier sacks, etc., the general type being used in machines handling packages weighing up to 750 lbs. This machine may also be conveniently used as one section of a horizontal or inclined conveyor system.

3. The **Sectional Conveyor** is made in lengths and weights to suit the conditions, all sections being interchangeable and complete with driving gear. The sections are supported by portable and interchangeable platforms, which in some cases, also contain the power equipment.

4. The **Unloading Machine** is used for unloading commodities in sacks, bales, boxes, etc., from gondola or box cars; from steamboats, ships, or barges and for elevating packages from basements to upper stories of warehouses. The carrier brings the packages up and delivers them on a table, from which they are slid off to a truck, or it may be combined with the Sectional Conveyor to carry the packages to any desired distance or location.

Catalog and Descriptive Information on Request

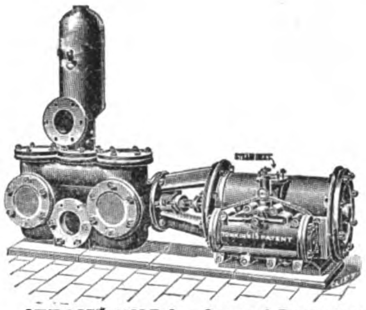
BROWN PORTABLE ELEVATOR COMPANY

Head Office: CHICAGO, ILLINOIS, U.S.A.

Shanghai, Yokohama, Tokio, Manila: **American Trading Co.**
Honolulu, T.H.: **Harry Dennison**

WE MANUFACTURE
PUMPS
FOR EVERY PURPOSE

To be worked by HAND, STEAM, BELT, WIND, WATER or ELECTRIC POWER.



STEAM PUMP for General Purposes.

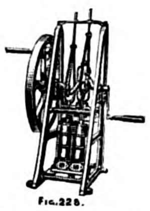
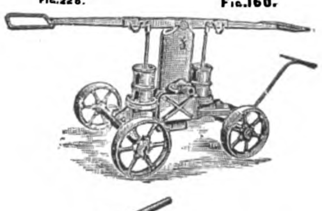
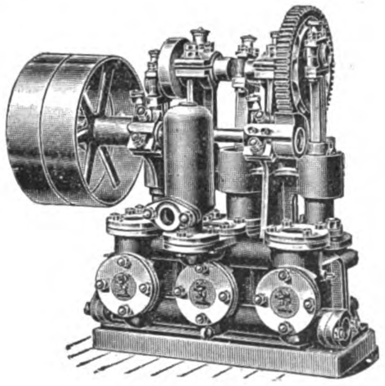
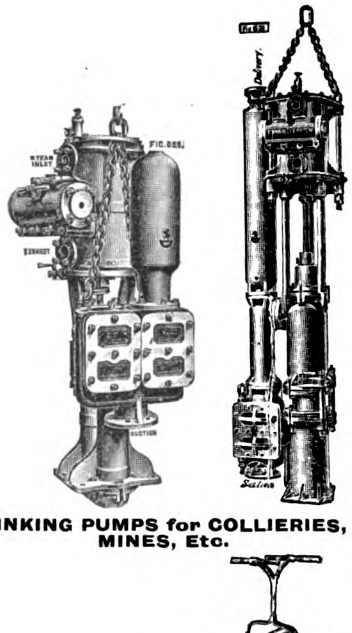


FIG.228.

FIG.160.



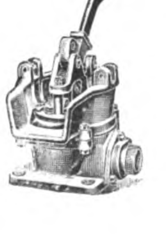




SINKING PUMPS for COLLIERIES, MINES, Etc.

FIG.191.

Write for "Eastern" List.



JOSEPH EVANS & SONS
(WOLVERHAMPTON) LTD.

CULWELL WORKS,
WOLVERHAMPTON, ENGLAND.

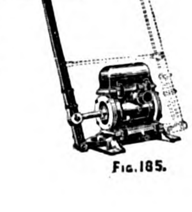


FIG.185.

HEATING
VENTILATING
HUMIDIFYING
BY
THE BLOWER SYSTEM

COOLING
VENTILATING
BY
FANS AND BLOWERS

DRYING SYSTEMS
FOR
TIMBER RICE
BRICK COPRA
CLAY FRUIT
TEXTILES
VEGETABLE, ANIMAL, MINERAL
AND
CHEMICAL PRODUCTS

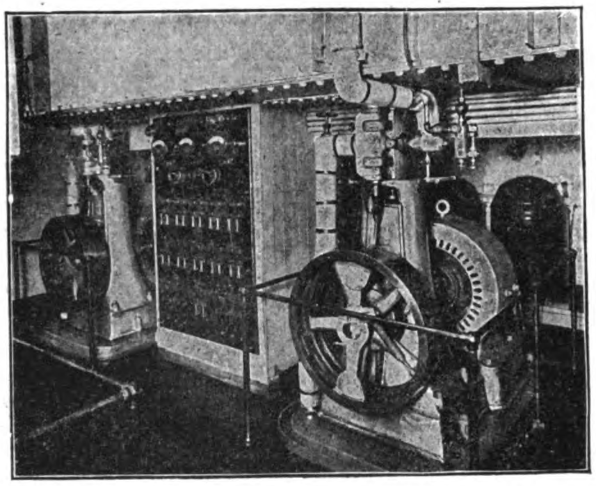
NAVAL FORCED DRAFT
AND
VENTILATING FANS

MECHANICAL DRAFT
APPARATUS
FOR
FURNACES AND STEAM BOILERS

PNEUMATIC
ELEVATING AND
CONVEYING
BY
EXHAUST FANS
AND
PRESSURE BLOWERS

BLAST EQUIPMENT
FOR
FORGES, FURNACES, CUPOLAS

AUTOMATIC RETURN
STEAM TRAPS
FOR BOILER FEED
AND WATER-LIFT



"ABC" Type A Engines direct connected to generators in Cri electlighting plant.

Are specially adapted for isolated electric lighting plants in factories, stores, warehouses, mines, on plantations, aboard ships, passenger steamers, yachts, dredges, etc., on account of the small space occupied and the large capacity for the weight, being not over 3½ watts per pound when attached to any standard make of dynamo.

Also invaluable for belt or direct connection to blowers, centrifugal or power pumps, mechanical stokers, chain grates, centrifugal dryers, cylinder dryers, bucket elevators, screw conveyors—in fact for any service requiring a dependable, economical engine.

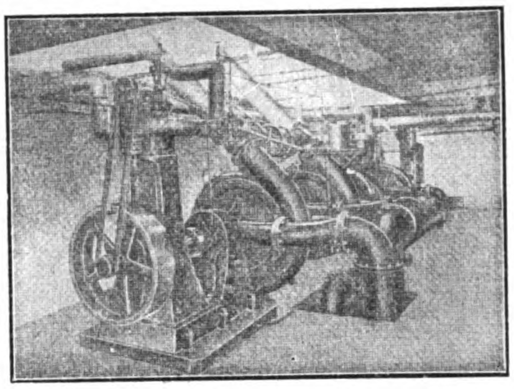
Where shall we send descriptive matter?

"ABC" Vertical Enclosed Self-Oiling Steam Engines

EFFICIENT AND ECONOMICAL

Engines of this type will run for months without the addition of fresh oil or the making of adjustments, these long runs being made possible by the patented system of lubrication.

No oil is wasted and the system insures a saving of four-fifths of the usual cost of lubrication. This feature is of inestimable value in locations where oil is expensive and difficult to obtain.



"ABC" Type A Engines driving centrifugal pumps for barometric condenser service.

AMERICAN BLOWER COMPANY
DETROIT. MICH.
U. S. A.

Represented by

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Hongkong, China,
Agents for China.

Mitsui Bussan Kaisha, Ltd.
Tokyo, Japan,
Agents for Japan.

Frank L. Strong.
105 Escolta, Manila, P. I.,
Agent for Philippine Islands.

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on the Asiatic Station

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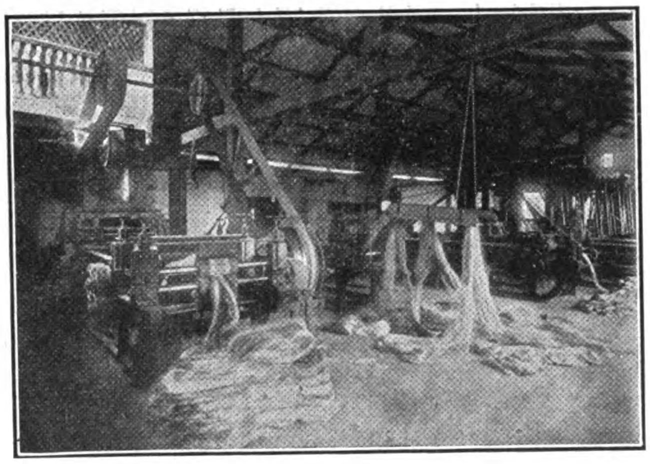

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Riverfront, Manila

Telephone 1123

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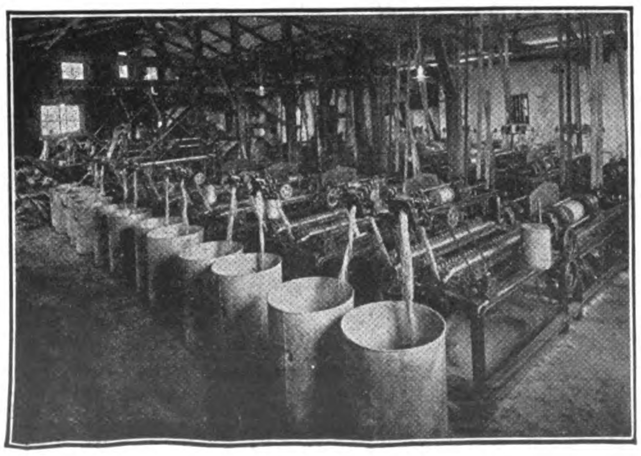
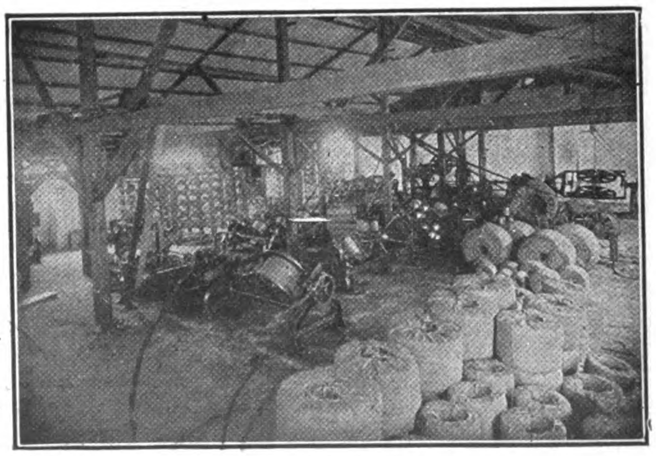
Codes: Western Union, Universal Edition and Private Codes

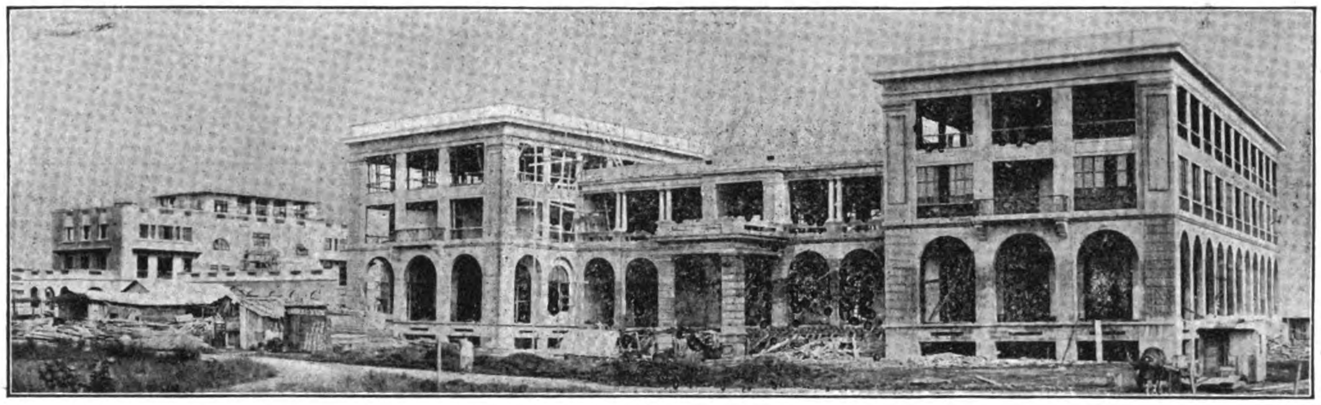
Correspondence Solicited



SPINNING



LAYING AND COILING



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THE **KAHN SYSTEM** of Reinforced Concrete has been employed in nearly ten thousand constructions of every possible type both in the United States and in foreign countries. These structures represent the best and most modern designs in bridges, hospitals, warehouses, factories, hotels, residences, office buildings, markets, theaters, reservoirs, tunnels, fortifications, etc. Innumerable special tests and exposure to actual fire, storm and earthquake have demonstrated beyond all question the exceptional qualities of **KAHN SYSTEM**. It is the *ideal construction method for tropical countries.*

KAHN SYSTEM Building Products comprise the following:
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Rib Bars for resisting direct stresses and shrinkage strains.
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Rib Metal, for reinforcing slabs, walls, sewers and conduits.
Rib Lath, the best steel lath for plastering and stucco work.
United Steel Sash, for fireproof windows. Give maximum daylighting and perfect ventilation to interiors, are fireproof, weatherproof and permanent.
Steel Floredomes, metallic tile to replace terra-cotta construction. Unbreakable—economical—speedily installed—permit lighter floor construction and lowest cost of erection.
"*Trus-Con*" *Chemical Products*, a complete line of dampproofings, waterproofings, finishes and special paints for every phase of concrete construction work.

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China.—Arnhold, Karberg & Company, Hongkong, Canton, Tsingtau, Shanghai, Tientsin.
Japan, Formosa & Southern Manchuria.—American Trading Co., Yokohama, Tokio & Kobe.
Straits Settlements & Siam.—Howarth Erskine, Limited.
India.—Burma: The Arracan Company, Ltd., Rangoon. *Bengal & Central India*: The Bombay Co., Calcutta. *Bombay Presidency, Sind and Northwestern Territory*, McKenzie's Sawmills, Ltd., Bombay. *Madras Presidency, Mysore, Travencore and Hyderabad*, Dymes & Company, Limited, Madras.
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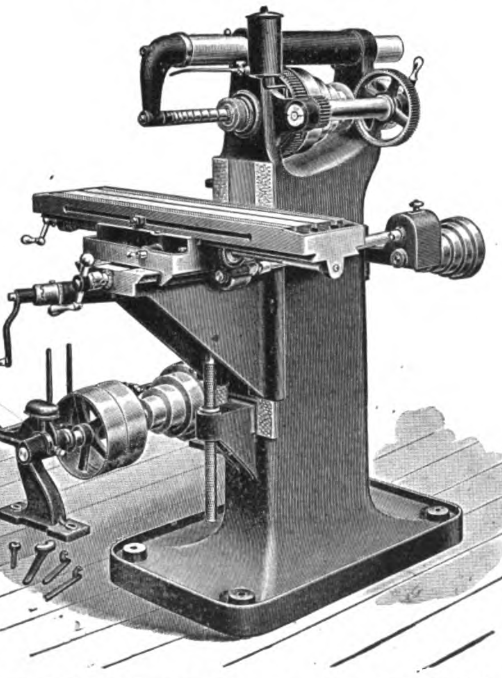

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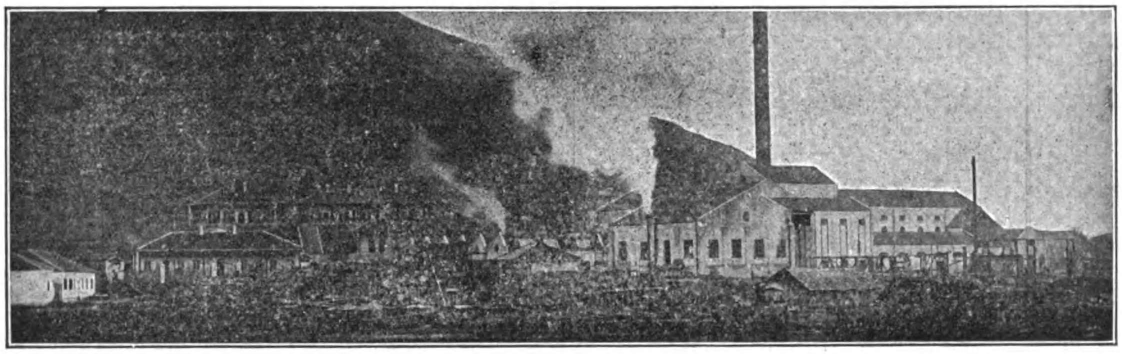

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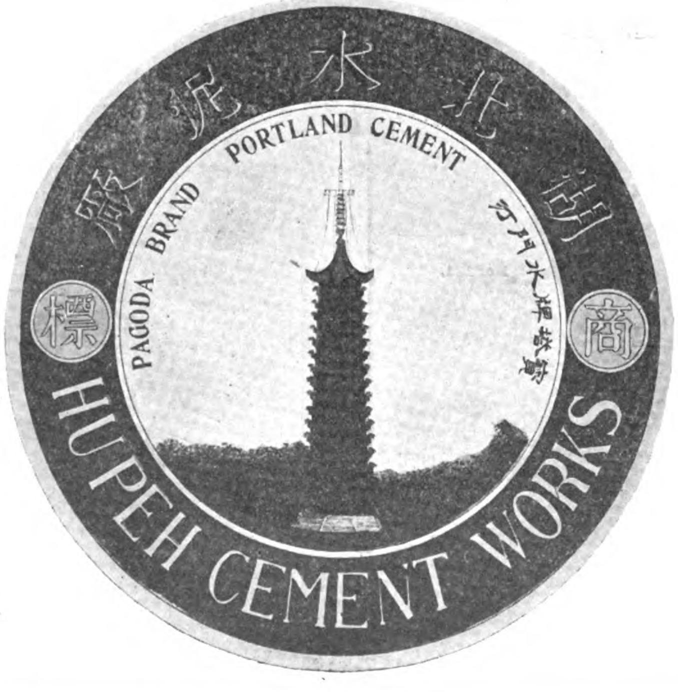
AWARDED first prize at the International Exhibition at Turin, Italy, 1911, on account of its excellent quality. For prices and particulars apply to,



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INSIST ON YOUR ARCHITECT SPECIFYING THE USE OF THE BEST BRAND OF PORTLAND CEMENT IN CONSTRUCTION, IF THE HOUSE OR FACTORY IS TO BE BLOCKS OR TILES, THEY SHOULD BE OF CONCRETE, IF STUCCO, ONLY THE BEST CEMENT SHOULD BE EMPLOYED, IF REINFORCED CONCRETE IS USED, ONLY A STANDARD CEMENT WILL STAND THE TEST, IF YOUR BUILDING IS TO BE FIREPROOF, WATERPROOF, SAFE AGAINST EARTHQUAKE OR TYPHOON, IMPROVING WITH AGE, AND LOWERING THE COST OF INSURANCE, YOU MUST EMPLOY CONCRETE, AND THE BEST CONCRETE CONSTRUCTION IS ONLY SECURED THROUGH THE USE OF

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GREEN ISLAND CEMENT is supplied in

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Also

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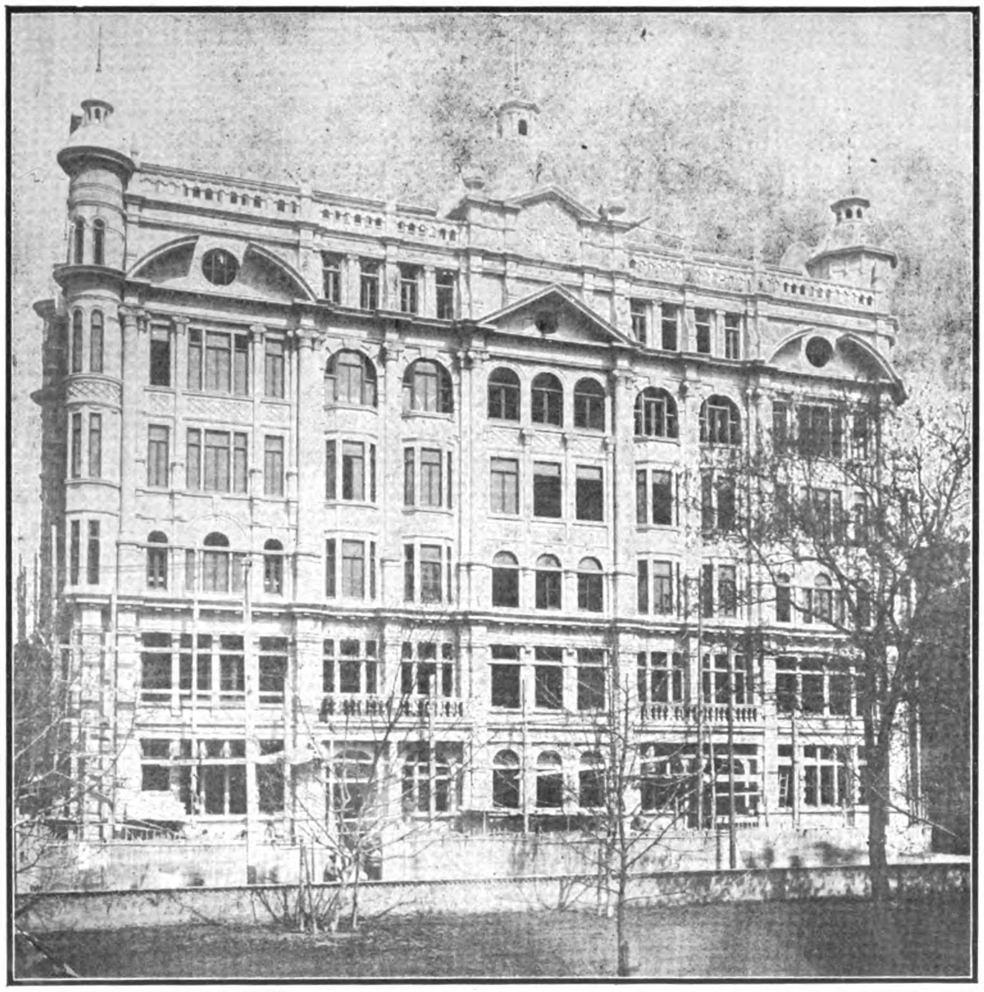

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(DAVIES & THOMAS, ARCHITECTS)
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THE GREEN ISLAND BRAND, HAS BECOME THE STANDARD PORTLAND CEMENT OF ASIA, OWING TO ITS PURITY, UNIFORMITY, AND TESTS.

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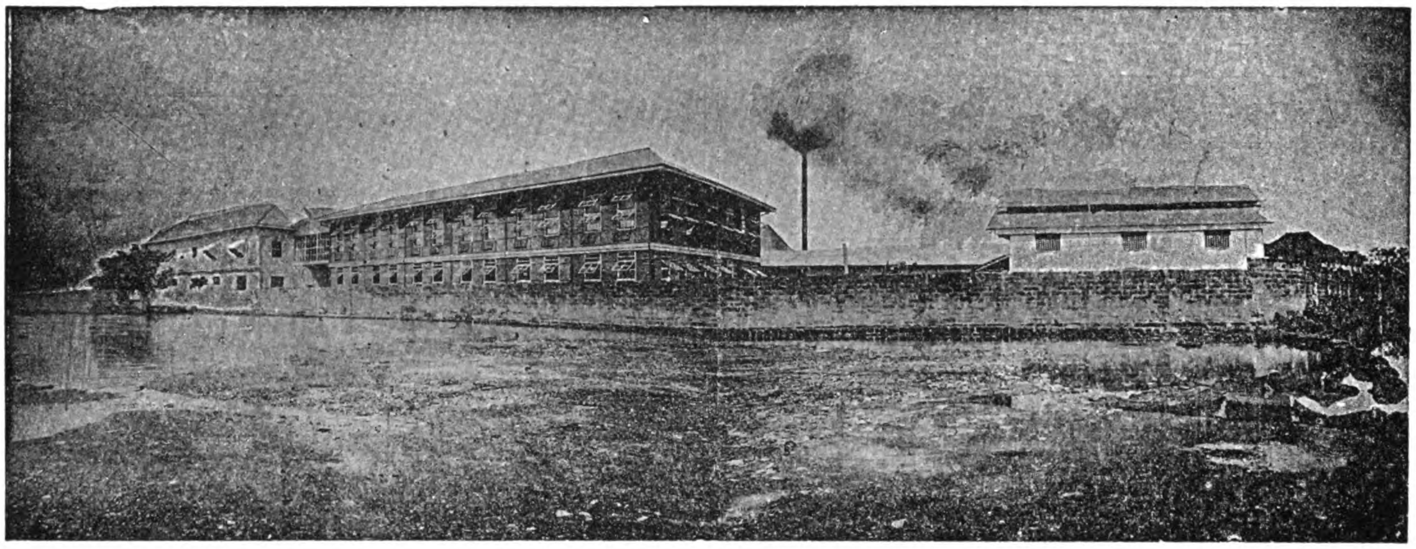

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View of the Factory from the Riverside.

WELL VENTILATED, AIRY WORKING ROOMS EVERYTHING UNDER EUROPEAN EXPERT SUPERVISION.

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We maintain the quality of each grade by strict supervision.
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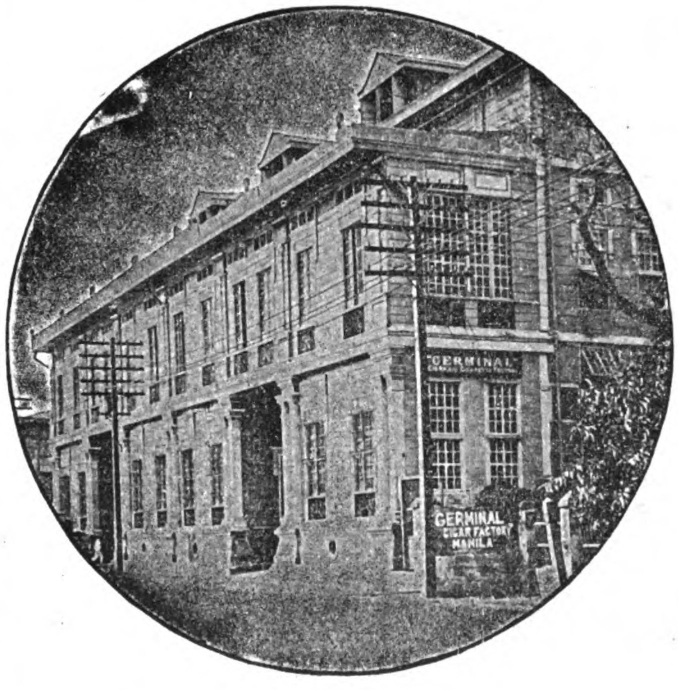

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FOR A MILD CIGARETTE SMOKE TRY THE "FLOREAL"

GERMINAL CIGARS THE UNIVERSAL FAVORITE

GERMINAL MANILA
TRADE MARK

This means the approval of discriminating critics; and shows an appreciation of he delicious richness of the choicest tobacco leaf, the exquisite aroma of an original blend, the finished touch throughout of an expert's hand - - - - - - - -

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in the principal cities of the world and towns of the Philippines

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High grade cigars manufactured with the most selected leaf grown in the estates of the Company.

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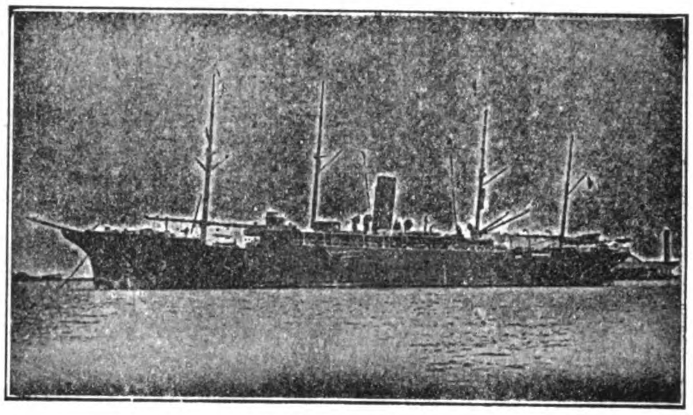

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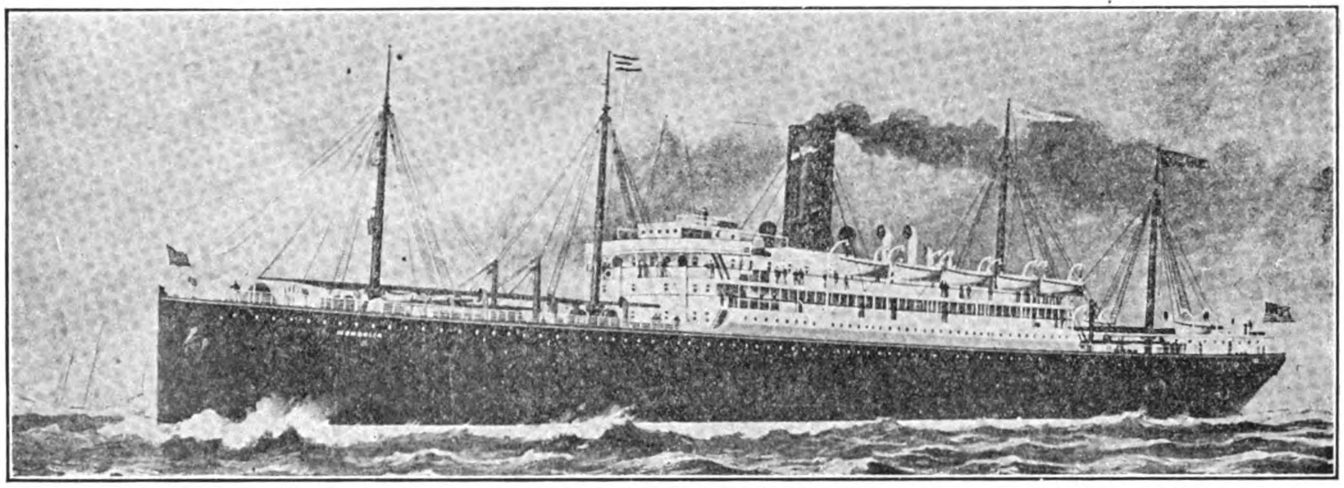

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FEATURES OF THE LINE:—Southern route; passengers enjoy outdoors throughout; deck bathing. The call at Honolulu, Oahu, the most fertile and beautiful Island of the Pacific. The only line to San Francisco, the greatest port of the Pacific.

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triple screw turbine
22,000 tons

SHINYO MARU
triple screw turbine
22,000 tons

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INTERMEDIATE SERVICE

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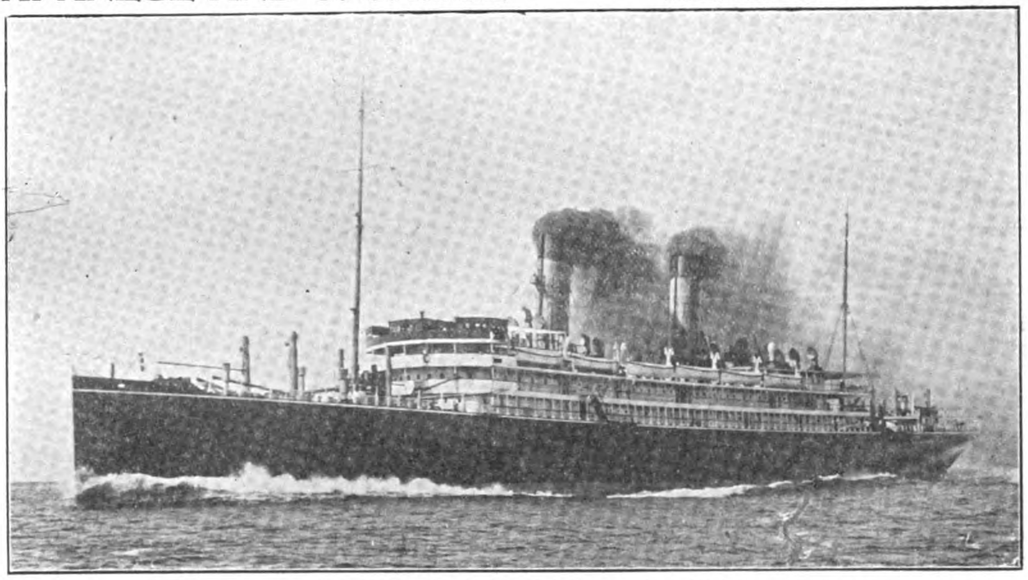
twin screw
11,000 tons



FLEET

HONGKONG MARU
twin screw
11,000 tons

KIYO MARU
17,200 tons

BUYO MARU
10,500 tons

SOYO MARU
7,900 tons

ANYO MARU
twin screw turbine
18,500 tons

SEIYO MARU
14,000 tons

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Hongkong—San Francisco, via Shanghai, Nagasaki, Kobe, Yokohama and Honolulu, with frequent calls at Manila.

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"Overland Limited" *TO THE EAST*

"Shasta Limited" *TO THE NORTH*

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"THE FINEST EXTRA FARE TRAINS IN AMERICA"

PULLMAN DRAWING ROOM AND COMPARTMENT SLEEPING CARS, DINING CARS, CLUB AND OBSERVATION CARS THROUGH **WITHOUT CHANGE** TO PRINCIPAL CITIES OF AMERICA.

THE BEST LINE TO **YOSEMITE VALLEY**, **YELLOWSTONE PARK**, **GREAT SALT LAKE** AND THE FINEST ROCKY MOUNTAIN SCENERY.

G. H. CORSE, JR., GENERAL PASSENGER AGENT

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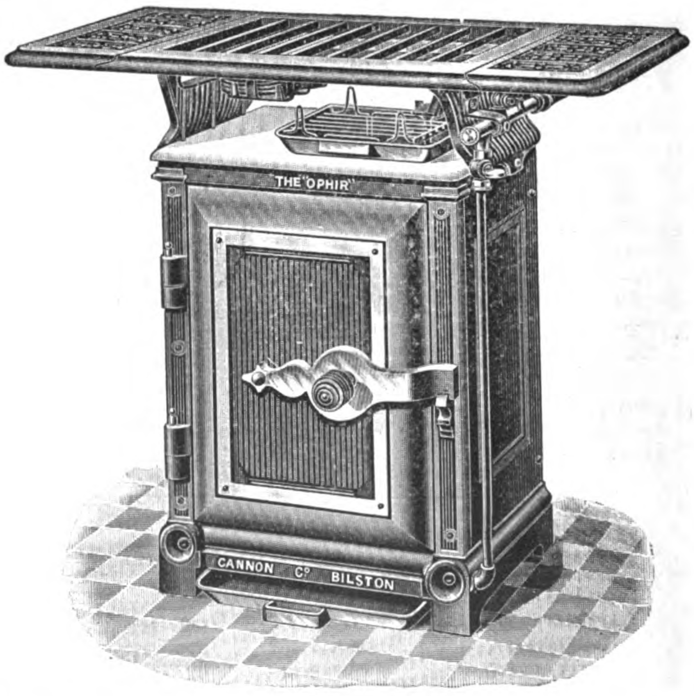
The Healthiest Form of Cooking is by Means of a Gas Cooker

IT IS

CLEAN
CHEAP
CONVENIENT
COOL



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Engineer's Office,
OR SHOWROOM,
5 THIBET ROAD,
29 NANKING ROAD.

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Manufacturers and wholesalers, Cotton Piece Goods, all lines of Dry Goods and Fancy Goods.

Our export department is equipped with an expert force and we make direct shipments to all parts of the world.

We desire to call particular attention to the fact that we make a special feature of packing and shipping goods to conform with the requirements of all markets.

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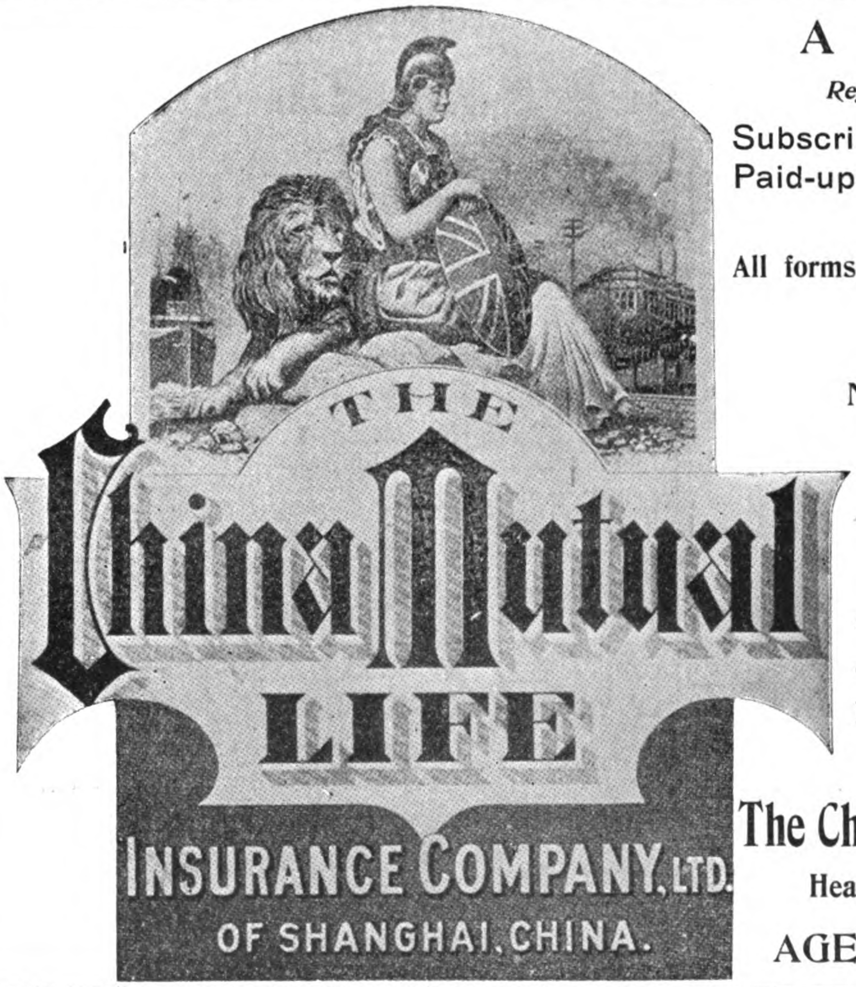

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Paid-up Capital - - - - -	„	50,000

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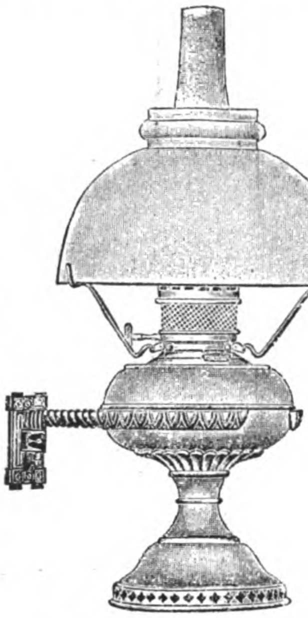
Make that Cold Room a Cozy Den

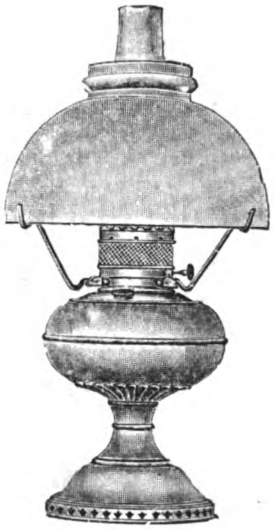
In nearly every house there is one room that is extremely hard to heat—it is therefore practically closed for the winter. This room can be made the coziest room in the house with no trouble by the use of



Perfection Oil Heater

(Equipped with Smokeless Device)

This heater gives intense heat, with no smoke, no smell. Turn it as high as you can to light it, as low as you can to extinguish it. Easy to clean, easily carried from room to room. Nickel or Japan finish. Every heater guaranteed.



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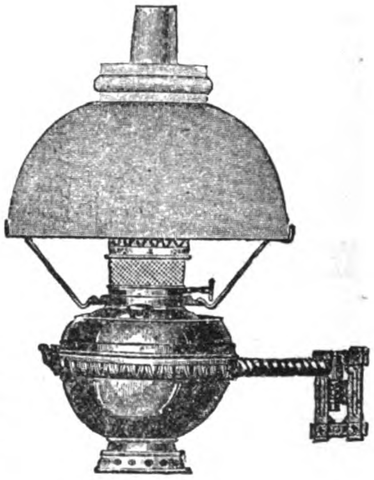
is the best lamp for all-round household purposes. Gives a clear, steady light. Made of brass throughout and nickel plated. Equipped with the latest improved central draft burner. Handsome—simple—satisfactory. Every lamp guaranteed. Extra shade.



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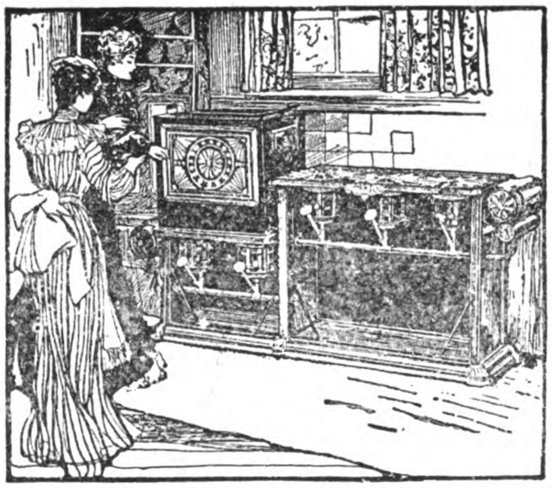
Absolutely Safe and Reliable

QUICK HEAT UNDER THE KETTLE AT LITTLE COST

SAVES TIME FUEL and TEMPER



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A COOL COOK, CHEAP FUEL AND A HOT MEAL

INDISPENSABLE FOR TROPICAL HOUSEKEEPING

THE NEW PERFECTION STEEL OVEN DOES AWAY WITH ALL THE DISCOMFORTS OF FORMER BAKING

THE ABOVE HEATERS, LAMPS AND STOVES, WITH ALL THEIR ACCESSORIES AND SPARE PARTS, CAN BE OBTAINED AT YOUR NEAREST DEALER

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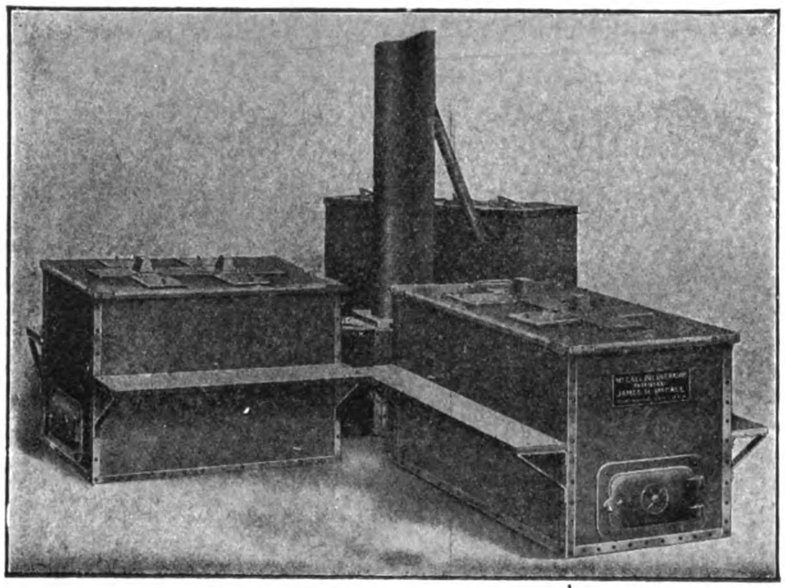

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The Health of the Community

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For Allaying the Dust, Preserving the Surface and Binding the Road

Experience and experiment have demonstrated that asphalt or oil with an asphaltum base are the *only* substances successfully applied to roads to insure *permanency of dust relief* and to *maintain the roads in perfect condition.*—In our three preparations we offer products that are suitable for road construction or road maintenance.—Adapted for all conditions of roads and for use in all localities. Our free book treats of each of these three products at length, explaining the uses for which they are particularly prepared, and furnishing information which will be found invaluable to Public Works Officials, Road Engineers, Government, Colonial and Municipal authorities, and to owners of private estates.—A copy will be mailed free on request.

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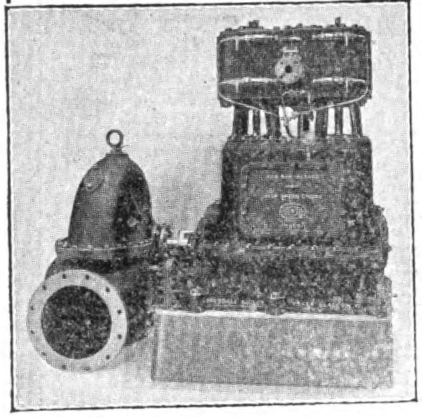

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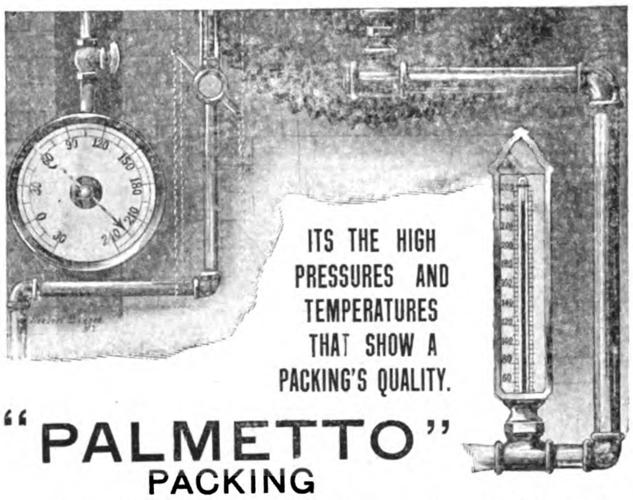

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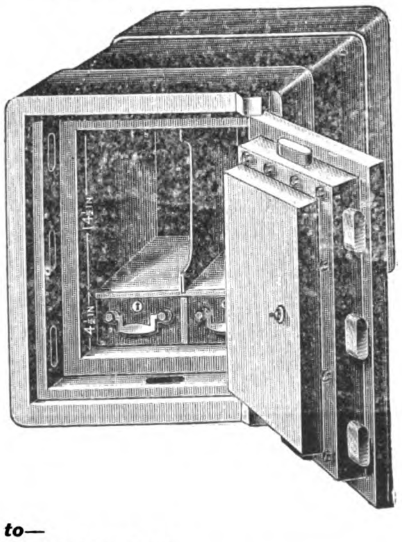

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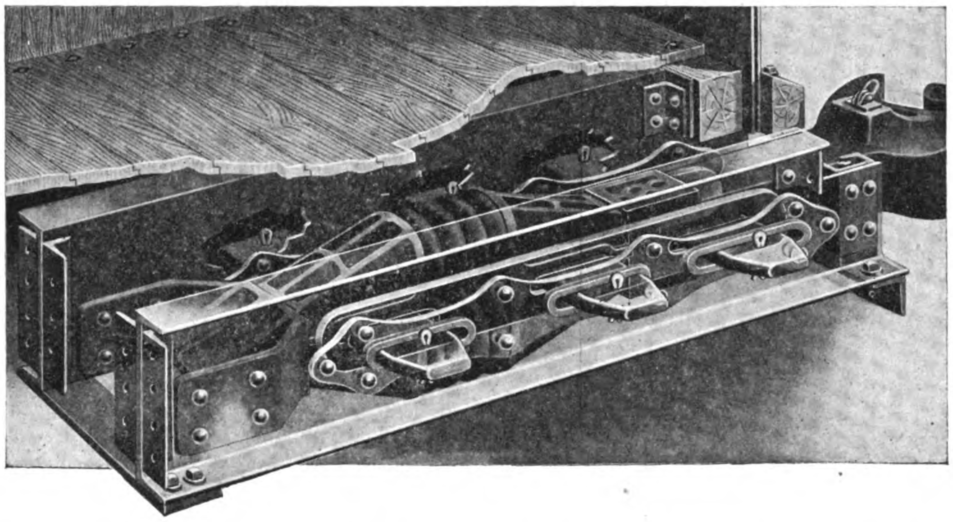

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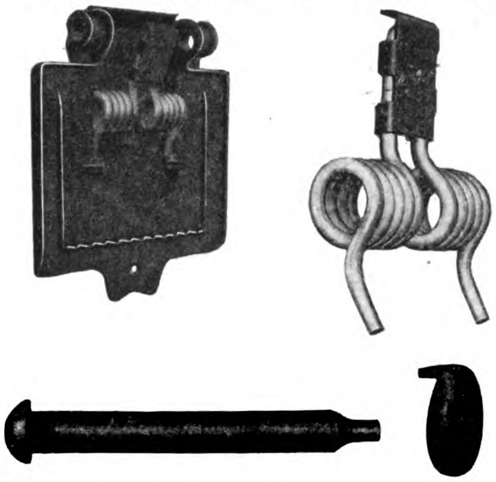
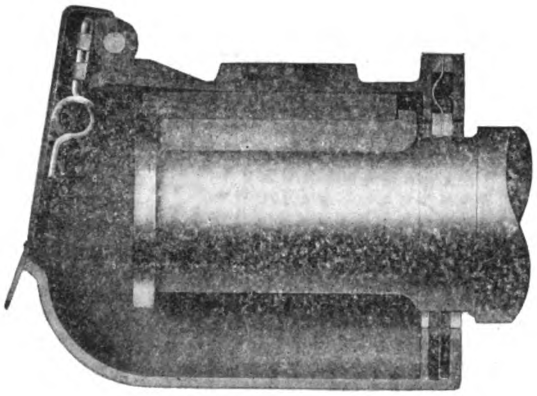


JOURNAL BOX AND DETAILS OF COVER



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Develop more than rated power
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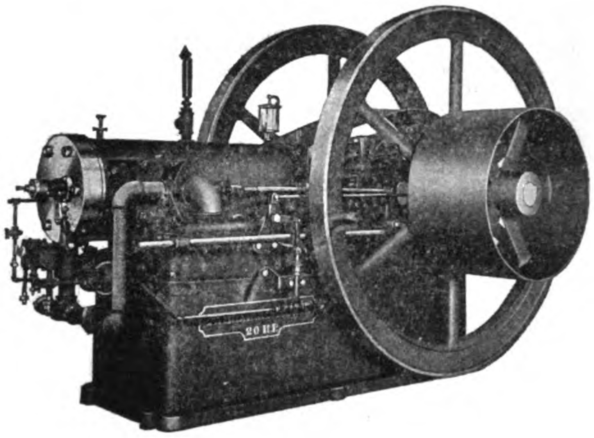

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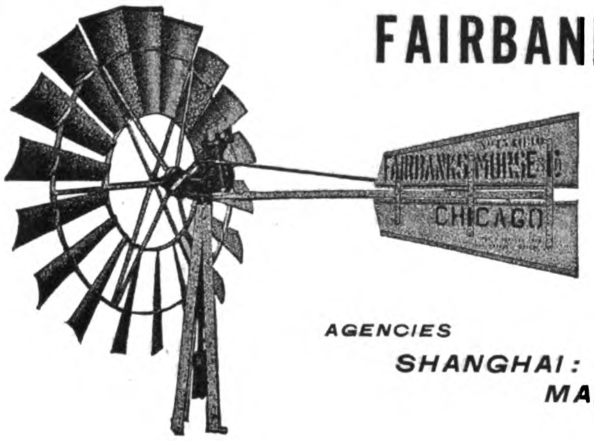

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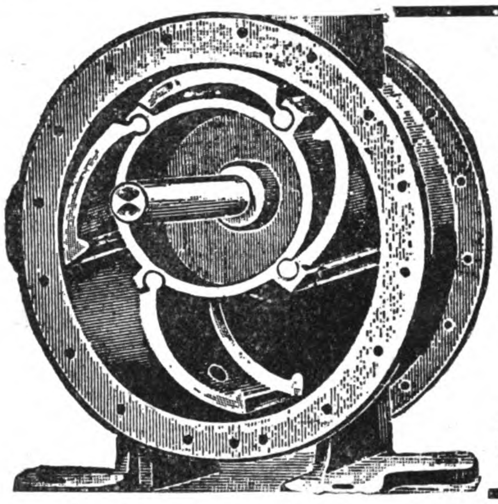

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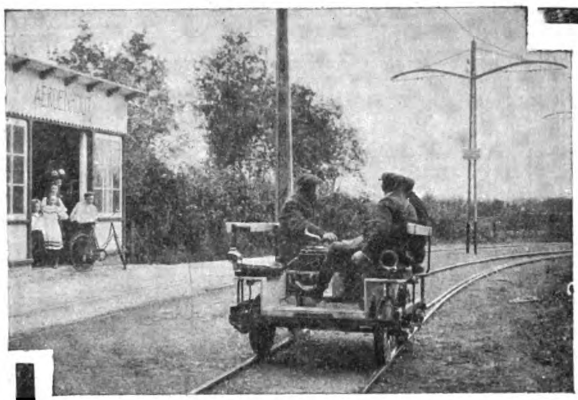

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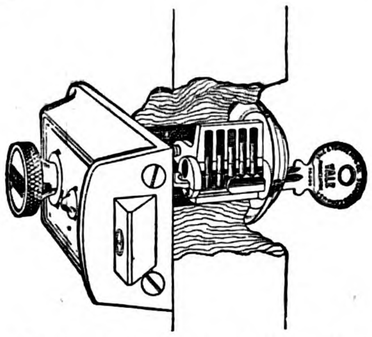

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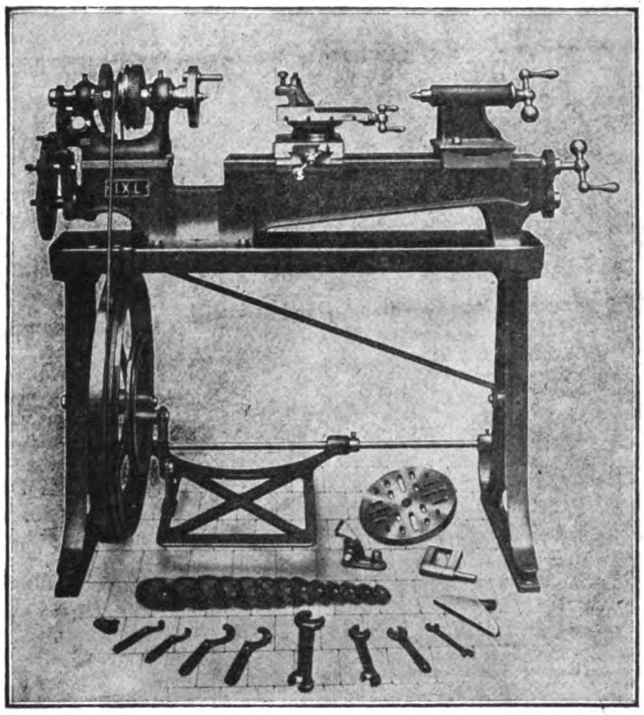

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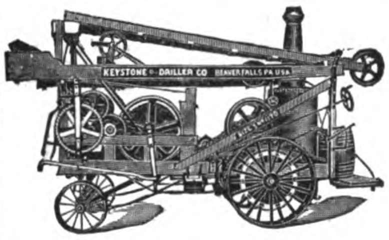

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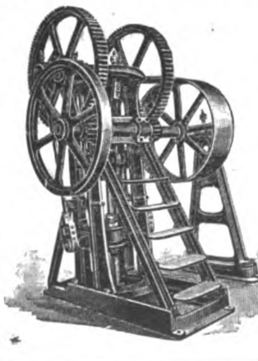

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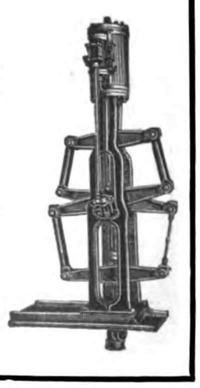

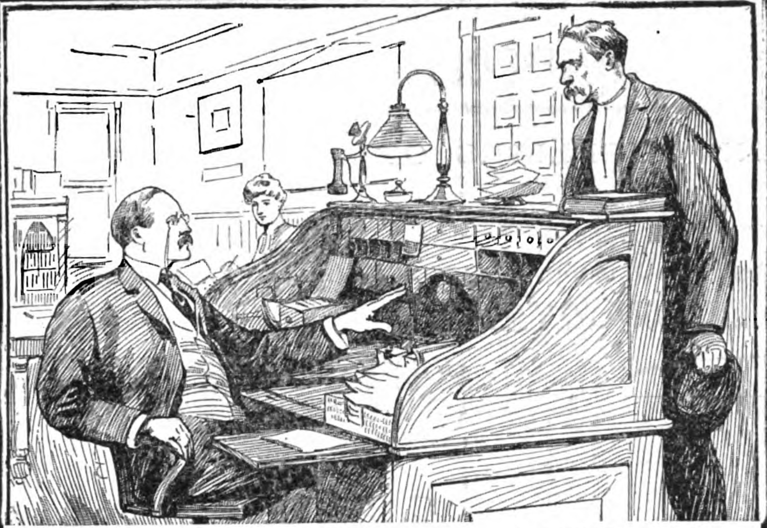

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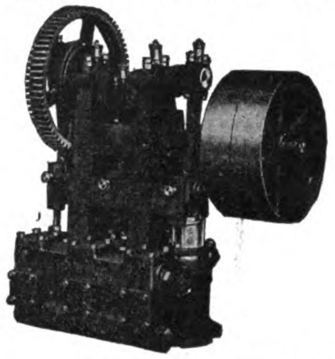

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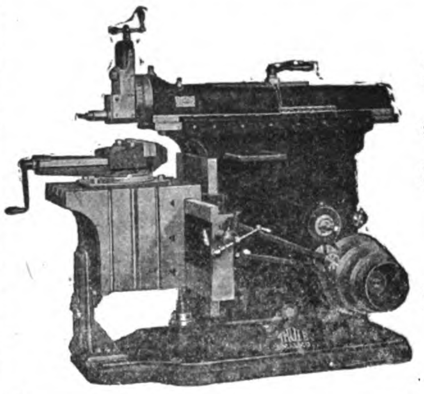

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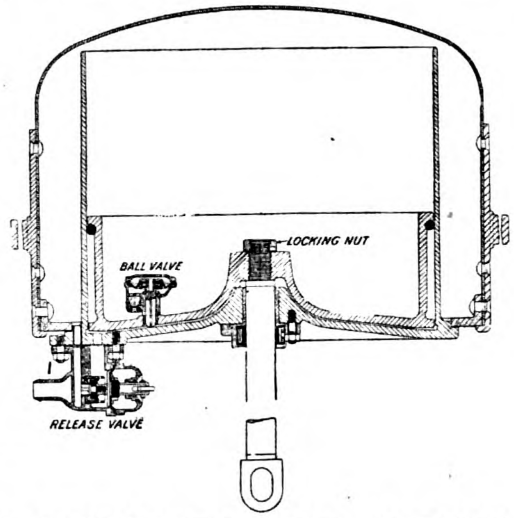

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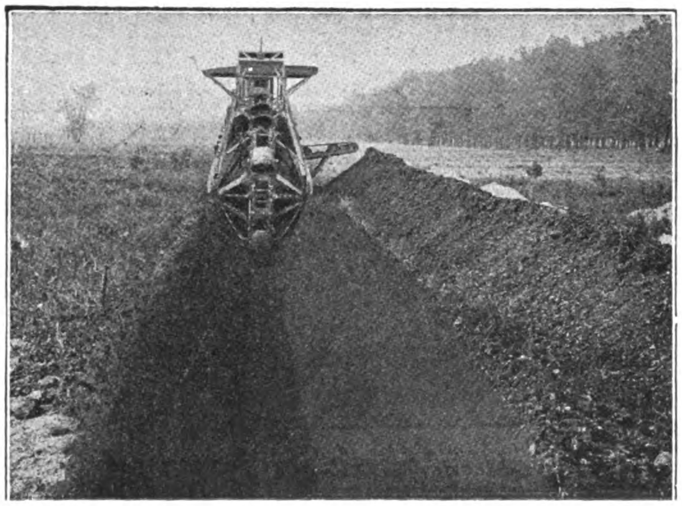

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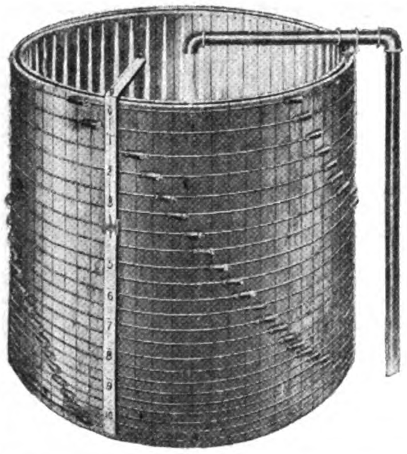

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Pukow	Dep.	9.00	9.40
Hsuchowfu ..	,,	17.44	19.44
Tsinanfu	,,	2.30 Tues. & Sat.	7.00 next day
Techow	,,	5.31	9.55
Tientsin Cen..	Arr.	10.43	15.35
,, ,,	Dep.	10.53	16.05
Tientsin East.	Arr.	11.03	16.15

DOWN TRAIN.

STATIONS		Wed. & Sat. Express	Daily Through Mail Service
Tientsin East.	Dep.	13.00	9.40
Tientsin Cent.	Arr.	13.10	9.50
,, ,,	Dep.	13.20	10.20
Tsinanfu	,,	21.54	19.30
Hsuchowfu ..	,,	6.41 Thurs. & Sat.	7.05 next day
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